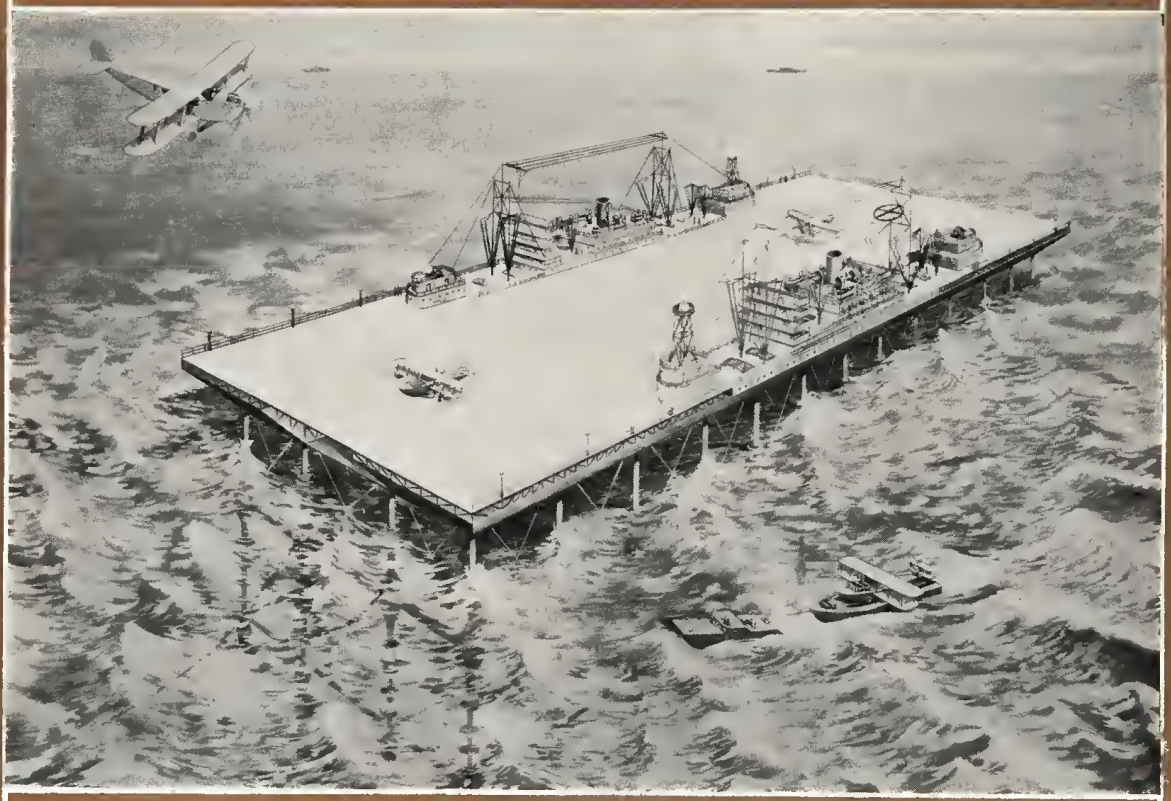
"If war were declared to-morrow, what would we do for aircraft?"

AVIATION

JUNE 4, 1923 Issued Weekly PRICE 10 CENTS



Proposed Seadrome for Transatlantic Commercial Air Service

VOLUME XIV

Number 23

SPECIAL FEATURES

PROPOSED AERIAL OCEAN TRANSIT

GEOLOGY AS AN AID TO AIR NAVIGATION

THE MARINE CORPS FLIGHT FROM COAST TO COAST

NEW F.A.I. RULING REGARDING CONTEST OFFICIALS

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
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CONTENTS

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AVIATION

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Vol XIV JUNE 4, 1923 No 23

The International Air Convention

WITH the ratification of the International Air Navigation Convention by Italy a further step has been made toward the unification of the laws of the air. As a result, today an identical set of regulations governs the navigation of the air in ten countries having an aggregate population of *715 millions*.

This is an accomplishment which it would be shortsighted to minimize. It has frequently been pointed out in these columns that the safety of international air transport will in a large degree depend upon the existence of a universal code of the air which would cover all questions pertaining to airworthiness, qualifications of navigating personnel, flying rules, landing signals, weather reports, identification of aircraft and airports, etc. etc. In the matter of airworthiness alone, which is an extremely important subject, it is totally unthinkable that American aircraft should answer one kind of requirements, Canadian aircraft another kind, and Mexican aircraft still another—seeing that one of the principal uses of civil aircraft will be in international traffic.

It is generally admitted that the International Air Convention is far from perfect and that it will require some modifications before it will be universally accepted as the law of the air. Yet, such as it is, it offers a fairly satisfactory basis for working out the many problems which daily arise in the application of international air transport in Europe.

Those who drafted this historic document deserve lasting credit. Theirs was a task beset with untold difficulties for the fundamental rules which would govern international air navigation had to be created without the benefit of experience or precedent. It was a great experiment, but subsequent events demonstrated its basic soundness. The British Empire, France and Belgium, which were the first to embody the Convention in national legislation, encountered little trouble in applying its provisions to Civil Aviation, while the benefits of this measure have been considerable and lasting.

The United States' attitude toward the Convention is now influenced by the consideration that the International Air Navigation Commission is placed under the League of Nations. This being the case, and there being little likelihood of the Commission being divorced from the League of Nations, it is difficult to see how this country can ratify the Convention which our delegates helped to draft and to which they affixed their signatures.

Nevertheless, the Convention has given such ample proof of its value that its principal provisions will undoubtedly be embodied in whatever international understanding the United States arrives at respecting air navigation. This latter problem will become acute as soon as an American air transport company will attempt to operate a passenger and freight service between this country and Canada—where the Convention is in force—or Mexico, for instance. It is hoped that the State Department will undertake negotiations to this effect at an early date, so our Civil Aviation will not be hampered in its legitimate growth.

Helicopter Piloting

ONE of the difficulties incident to the testing of helicopters which is generally overlooked is that the piloting of such machines differs considerably from that of airplanes and that the men who undertake this hazardous work have to teach themselves to fly, just as the Wright brothers, Curtiss, Bleriot and the Farmans did some fifteen years ago.

Col. T. H. Bane brings out this point in a letter written to Prof. G. de Bothezat, whose helicopter he piloted on most of its trials. "It takes some time," he writes, "to get the 'feel' of a new machine of this sort. On some flights I felt as though I could anticipate every oscillation or movement and correct for it; on others I was a little too slow. I can't help thinking that in more skilled hands better results still would have been obtained, but of course skilled helicopter pilots do not yet exist."

M. Oehmichen, the French helicopter inventor and pilot also contributes some interesting observations on the difficulties of helicopter piloting. He says that "it is a hard job to fly a helicopter near the ground, although in proportion as height is gained the flying becomes easier and gives a marvelous sensation of mastery. As soon as the machine reaches a height of ten to twelve feet, the pilot loses the sensation of power essness, for the oscillations correct themselves almost automatically.

"Experience derived from some 150 flights shows that the helicopter lifts off with a horsepower 20 per cent less than that required once the machine reaches a height over the ground equal to the diameter of its propellers. Within this zone of "ground gusts" which the helicopter creates by means of its own propellers, the stability and controllability of the machine are poor, but above this zone the oscillations die out and the machine readily answers the controls. Many failures of helicopter experiments may be attributed to that the pilots, in view of the apparently uncontrollable oscillations of the machine, hesitated to rise beyond this zone of ground gusts for fear of totally losing control."

The value of these observations will be apparent. The more we learn about the operation of helicopters the easier will be the subsequent development work, for progress can only come from a close cooperation between theory and practice.

Commercial Ocean Transit by Airplane

A Proposed Service — With Capital Cost Estimates and Operating Expense

By E. R. Armstrong

There seems ample justification for the statement that modern civilization is in its ultimate analysis progress in transportation and communication, and is measured by and proportional to increase in speed of same. It is interesting to chart human evolution as a function of speed of transportation. Beginning in the dark ages of the 16th century, with the forerunner of the stage coach, transportation over land and water has developed the railroad, the steamship and the automobile and has culminated in the 20th century by the invention of the airplane. This seemingly, judging by Fig. 1, is the final limitation of speed in transportation unless new discoveries are made permitting the utilization of atomic forces. Knowing the immense wealth invested in railroads, steamships and automobiles (about one third of the constructive wealth of the nation) and the relative speed of these different methods of transportation, there can be no doubt that the airplane because of its higher speed will eventually occupy the premier position in the world of transportation.

A very perfunctory survey of the transportation field proves conclusively that the essential conditions for successful commercial aviation are nowhere more favorable than on the North Atlantic route between New York and London, the business centers of the old and the new world. What other traffic route joins three hundred million people who own or control over one-half of the total wealth of the world? On what other route do 2,500,000 passengers annually make a 3500 mile voyage? The North Atlantic journey is then unquestionably the voyage requiring the most time on the longest route made by the greatest number of people and is therefore the route on which the time saving possibilities of the airplane will apply with the greatest economic advantage.

Due to many causes, a discussion of which is outside the province of this article, the airplane, now developed to a high state of mechanical perfection, has had a very limited application to commercial transportation.

To demonstrate conclusively that the airplane of today can be used economically in commercial transportation across the North Atlantic Ocean between New York and London and how this desirable object can be accomplished is the purpose of this article.

A Chain of Seadromes

As a fundamental premise, no one can doubt but that the airplane would be in every day use for the ocean crossing provided Europe and America were only 400 miles apart and the trip by plane required but one day as compared with seven or more days for the same journey by boat. As a further amplification of this basic assumption a system of airplane ocean transit in which the longest journey from point to point would not exceed 400 miles, should be equally practical. It was the Islands of the Azores that made possible the trans-atlantic flight of the NC flying boats, so anchored seadromes on the Atlantic route (the engineering equivalent of nature's islands) spaced at economical flight distances, should make crossing the Atlantic by air less difficult and hazardous than the trip now made by steamship.

On the theory that one must creep before learning to walk many may question the wisdom of attempting to utilize the airplane in the preliminary stages of its commercial development, on such an ambitious scale as that involved in applying it, in the first instance, to the North Atlantic route between New York and London.

In appraising the solution of this problem as offered herewith it must therefore always be born in mind that navigating the Atlantic as proposed is not an air journey of 3600 miles but a series of short flights, each 400 miles long requiring but three or four hours in the air, journeys of which length are today very ordinary and of every day occurrence. Short flight distances also permit economy of operation so when airplane travel to Europe is established the average business man could not afford to go by boat if carried free because of the saving of time.

A very slight acquaintance with the fundamentals of airplane design is sufficient to check the statement that the economic flight distance of an airplane, without refueling can rarely exceed 500 miles. This is true even of the largest planes built or projected. Considerations of safety, control and human psychology determine even more definitely this limit to flight distance on the Atlantic route. The problem, then, of commercial ocean transit by airplane is not one of building super-airplanes or awaiting new developments and discoveries in the science of aviation, but rather that involved in providing seadromes on the ocean route. This is almost entirely a problem of marine engineering and naval architecture, involving nothing more serious than constructing suitable stations and anchoring them securely on the route selected.

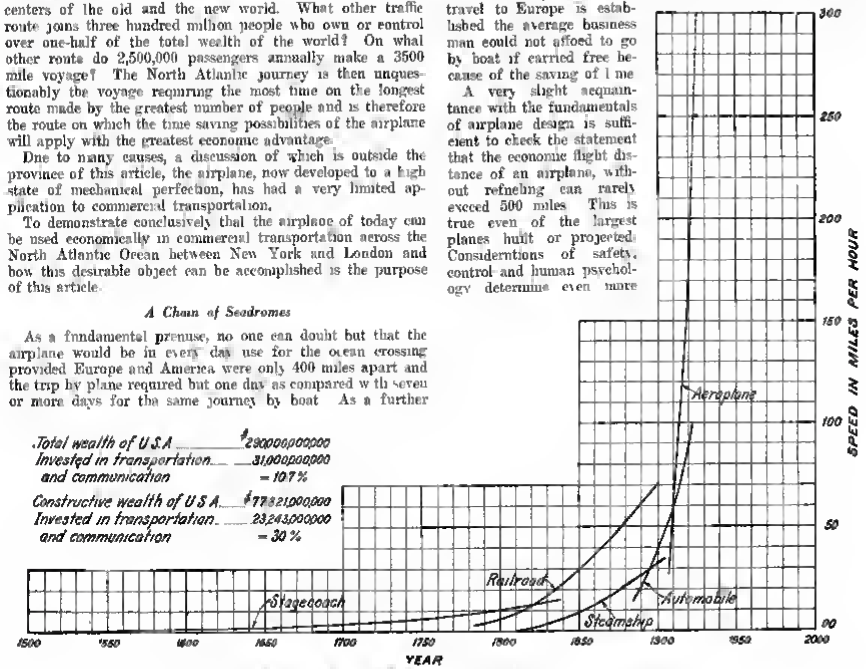

Fig. 1. The progress of transportation, showing the limit speed of various means of transit from the stagecoach to the airplane

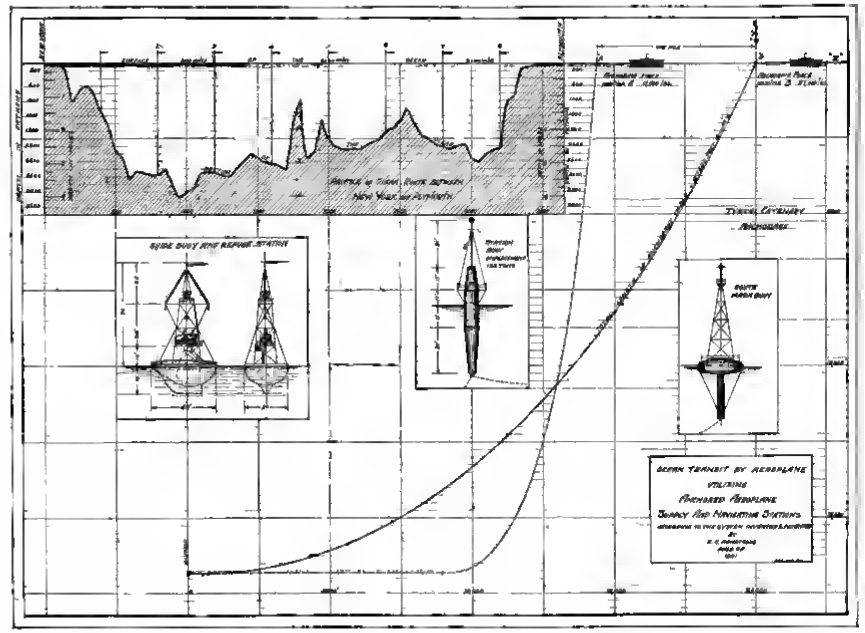

Fig. 2. Profile of bottom of North Atlantic Ocean, with system of mooring seadromes and type of buoys proposed

As the result of several years concentration on the problem of applying aviation to commercial ocean transit, a method of anchoring a floating station in the deep waters of the Atlantic has been developed. It being very essential that a level landing deck is maintained at all times, a seadrome has been designed giving adequate area for airplane operation that will not roll and pitch under the action of wind and waves of the most severe of ocean storms. The best route has been selected and the capital expenditure necessary to put airplane ocean transit in effect has been estimated and operating expense schedules determined from which the probable return on the investment has been forecasted.

Unless there are serious flaws in the premises and the calculations based on same it is very evident that commercial airplane ocean transit is a matter only of availability of capital and the use of engineering skill in its expenditure.

Deep Sea Anchorage

An inspection of the profile of the ocean depths on the North Atlantic route (Fig 2) shows that seadrome anchorages must be made in water approximately three miles deep. While the idea of a safe and permanent anchorage at this great depth may, in the first instance, be rather startling, a little consideration and study determines the essential conditions for such an anchorage, one solution of which is offered herewith.

Marine authorities are a unit in agreeing, as the result of observation and experiment, that a ship capable of eight knots an hour can make headway against the most severe Atlantic storm. From full scale deep sea towing experiments it has further been determined that in towing a 12,000 ton ship at eight knots the towing hawser will be subjected to approximately 25,000 lb. tension. It is therefore believed that an anchoring system capable of safely sustaining, for an indefinite period, three or four times this tension will be a practical operating system.

The deep sea anchorage devised is shown in Fig. 2, in which provision is made to always maintain the anchoring cable in a catenary curve (the curve assumed by a flexible chain or cable of uniform section and material loaded with its own weight only) under which condition the strains in it cannot exceed those predetermined and controlled by the unit weight and total length of same. This strain limit feature is essential in that at the anchorage depths contemplated anchor cable strains, if unregulated, might easily and frequently exceed the maximum strength of same.

In the system illustrated a 2¼ in. galvanized steel cable 27,600 ft. long is used, having attached to its lower end a 12,500 lb. anchor. At the surface end a spar buoy with a displacement about equal to the weight of the anchorage cable is connected, so that surface rise and fall of the ocean during storms will submerge the buoy to a greater or less degree rather than create heaving strains in the anchorage cable itself. A towing hawser approximately 1,000 ft. long connects the station buoy with the seadrome.

From an inspection of the anchorage diagram it is obvious that the oblique force X developed by the suspended anchorage cable is resolved by the station buoy floating on the surface of the ocean, into a vertical force Y and a horizontal force Z. In the full catenary position B the anchoring force Z is about

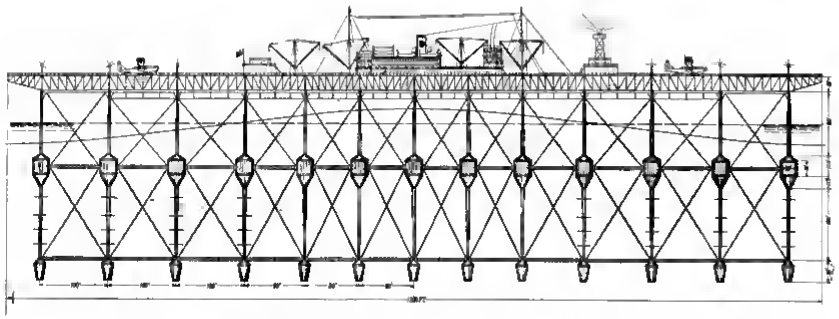

Fig. 3 Longitudinal section of proposed seadrome for aerial ocean transit

100,000 lb. which is several times greater than the maximum drifting force which the seadrome will be subjected to. For all strains less than the maximum calculated above the catenary curve assumed by the anchorage cable will be shortened, the excess length of cable lying on the ocean floor automatically equalizing force *Z* with the drifting force of the wind and waves acting on the seadrome. From position *B* of Fig. 2 the movement of the seadrome a distance of one mile to position *A* has decreased the anchoring force from 97,000 lb. to 11,500 lb., the catenary curve of the anchorage cable being shortened to correspond as illustrated.

On the route selected the ocean floor is practically level and covered with Globigerina ooze under-laid with red clay which provides an ideal anchoring bed.

Seadrome Construction

It is evident to all concerned with the operation of seaplanes under storm conditions at sea, that a near approach to a 100 per cent operation of an ocean airplane service would not be possible if all landings and take-offs were made from the surface of the sea. On a regular service, sea landings by the flying equipment while possible, should be accidental and very infrequent. Deck landing and take off being an essential condition of ocean air service, seadromes must have level landing decks of adequate area. Modified "motherships" due to their rolling and pitching under storm conditions are unsuited for seadromes. In fact an entirely new idea has been introduced in marine construction to produce a floating structure not influenced by wave disturbance and which will remain level under all conditions of wind and waves.

The seadrome illustrated in Fig. 3 is of 15,000 tons displacement and has a landing deck 400 ft. wide by 1200 ft. long, 70 ft. above the normal sea level. Approximately 95 per cent of the total displacement is below the maximum wave disturbance line, so for all practical purposes the structure is floating in still water and will remain level irrespective of the roughness of the sea. Storm waves are, relatively, only surface disturbances of the ocean, the greatest wave recorded on the North Atlantic having an amplitude of 42 ft., creating but little movement 50 ft. below the normal surface of the ocean. Supplementing the stations, as aids to navigation and safety of operation "route buoys" are anchored at 50 mile intervals, all of which are arranged for automatic illumination at night.

Considerable thought has been given to the problem of selecting the best route for airplane travel to Europe, suggested routes ranging from the Arctic Circle to the Islands of the Azores. The one most frequently suggested from New York is via Halifax, Nova Scotia, Labrador, Greenland, Iceland to Scotland and London. If storms, ice, fog and freezing temperatures are desirable conditions on an ocean airway then this route will qualify 100 per cent. Without exception all the air routes to Europe so far projected have been located solely with the view of making the flight distance between points as short as possible and within the practical limits of airplane operation.

The ability to anchor the seadrome in any depth of water makes it possible to select the route best suited to aerial navigation. The most cursory inspection of the pilot charts of the North Atlantic determines that a route somewhat south of the regular steamship track to Europe is in a marked degree free from the storm, fog and ice hazards of navigation so prevalent on the more northerly steamship route. It may safely be stated that the route shown in Fig. 4 will be subjected to less than 10 per cent of the storms experienced on the regular steamship track, while fog and ice will be relatively unknown. The temperature in midwinter is also very mild on this southern route averaging about 50 deg. F. compared with 32 deg. at New York and 42 deg. at Plymouth.

Capital Investment Estimate

The commercial practicability of the airplane ocean transit system outlined can to a considerable extent be determined by assuming a definite service income from which the capital cost and operating expense can be computed and the return on the investment compared with other transportation systems.

From United States Immigration reports covering the past thirty years it is estimated that by 1926-1928 about 1,600,000 cabin passengers will arrive at and depart from the port of New York from and for Europe. It is assumed that 10 per cent of these passengers would travel by air if rates are at all comparable to first class steamship fares. It is also assumed that all first class mail would go by air with an equal weight of express matter.

All passenger fare estimates that have previously been made in connection with ocean air routes have been considerably higher than equivalent steamship rates. That airplane transportation across the Atlantic by the seadrome system is even more economical than steamship transportation is summarized in Fig. 5, from which data there seems scant justification for building the frequently proposed "thousand footers" and adding them to our Merchant Marine, when at no very distant date the same investment in airplane equipment will carry many times the number of passengers across the Atlantic in one sixth of the time. No attempt will be made here to give a detailed account of the operation of an ocean airline or to forecast the extent to which the seadromes will be utilized commercially in supplementary services such as repeater stations for trans-ocean radio and as Government meteorological stations for weather forecasting. An attempt will only be made to roughly outline the direct air service, determine the income and operating cost and estimate the return on the investment.

As indicative of the proposed service schedules are given herewith, the actual elapsed time in every case being corrected to the local time of the respective terminals. From these schedules it will be noted that under normal conditions the

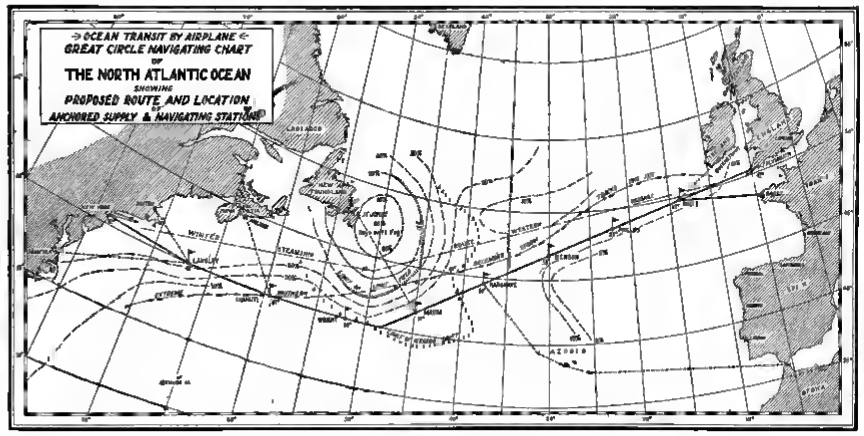

Fig. 4 Chart of the North Atlantic Ocean showing proposed air route from New York to Europe with anchored seadromes spaced 400 miles

planes will be refueled, inspected and if necessary replaced at each station. Passengers will also get their meals at the stations which will to a great extent break up the tedium of the journey. On the eastern passage the upper air currents will be utilized materially to shorten the journey.

The capital investment necessary for the service contemplated is given herewith together with an estimate of the annual operating expense from which is computed the net yearly revenue.

CAPITAL ACCOUNT ESTIMATE
Income and Operating Expense

INCOME

Passengers 100 000 per year at $450 00 each	$ 45 000 000
(this is approximately the first class rate on Majestic)	
Mail 5 000 000 lb. at $1 50 per lb.	7,500,000
(less than ½ mail per lb. rate)	
Express 5 000 000 lb. at $1 00 per lb.	5 000,000
Gross Income	$ 68 500,000

CAPITAL INVESTMENT

Flying Equipment		
U. S. Air Mail and British commercial airways operate annually with an efficiency of 95 per cent or at the rate of 348 operating days per year: Each passenger with baggage is estimated to weigh 210 lb. therefore 180 000 passengers at 210 lb.	35,000 000 lb.	
Mail and Express total 10 000,000 lb. giving as the total Annual pay load	45,000,000 lb.	
Daily "	126 000 "	
Daily pay load lb. miles (2800 mile trip)	453 800 000	
Flight miles per plane per day	800	
Pay load per plane per flight (lb. lb.)	4 800	
Daily lb. miles per plane (800 x 4800)	3 840 000	
Airplanes required on route 120 at $40 000		$ 4 800 000
Spare parts (10 per cent of first cost)		480 000
Extra power plants (motors and propellers) 120 at $8 000		960 000
Total Flying Equipment		$ 6 240 000
Supply Stations		
Each 1200 ft. long by 400 ft. wide 12 000 tons displacement at $150 per ton, eight required:		$ 12,000,000
Work and Rescue Buoys		
Route markers and intermediate rescue stations with cable and anchors, seventy-five required including spares at an average price of $1500		$ 112 000
Anchorages		
Average depth of the ocean at station points about 3 miles, anchor cables, cable buoys and station hawsers will cost for each station $50 000 eight anchorages required		$ 400,000
Trouble Ships		
Ten 30 knot Sea Sled type rescue ships required at $180 000		$ 1,800,000
Supply Ship		
For supplying stations with fuel and maintenance supplies, 4 000 ton ship at $200 per ton		$ 800,000
Terminal Stations		
Two required with repair equipment, accounting and storage facilities at $125 000 each		$ 250 000
Radio and Meteorological Equipment		
For Stations, Terminals and Buoys		$ 500,000
Incidentals		
Unlisted minor items		$ 800 000
Total Equipment Investment		$ 26 802 500
Engineering, design, construction, organization		2,697 500
Total Capital Invested		$ 29,500,000
Surplus and Working Capital (25 per cent)		$ 10 500 000
TOTAL CAPITAL REQUIREMENTS		$ 40,000 000

OPERATING COST

(1) Fuel (Grease oil and gasoline)		
Airplane miles per day (120 x 800)	96,000	
Airplane miles per year (96000 x 348)	33 216,000	
Airplane speed (for fuel calculation)	100 m.p.h.	
Airplane horsepower 385 at ½ lb. fuel + oil per hp. hr. = 5.1 lb. per airplane mile, plus 20 per cent for test and waste = 6.1 lb. or one gallon per plane mile at 25 sts. per gal. (33 216 000 x 25)		$ 830 400
(2) Piloting Cost		
Each airplane on flying duty requires one pilot and assistant. Normal pilot duty consists of two flights of 400 miles each twenty days per month. Combined pay plus expense for pilot and assistant is estimated to be $850 per month. Pilot insurance and extra flying (testing and ferrying) will increase this to $1 000 per month. Each pilot and assistant flying 16 000 miles at $1 000 = 6½ cents per mile. The annual airplane route mileage is 33 216 000 which at 6¼ cents per mile equals		$ 2,076,000
(3) Flying Equipment		
Insurance, Depreciation, Maintenance and Repair. Commercial type airplanes, when properly maintained have a useful life of several years. Air Mail and British Airway costs, such as are available determine that annual maintenance equal to final cost will be more than ample insurance against total loss of flying equipment will not take a higher rate than 15 per cent on		
Insurance (airplanes only)	$ 720 000	
Depreciation at 33⅓ per cent (airplanes only)	1 800 000	
Maintenance and Repair (100 per cent)	4,800 000	
	7,120 000	
Total		$ 7,120,000
(4) Supply Station (Operation and Maintenance) Covers operation of the station the landing and take off of planes, dispatching of same and meteorological control. The operation of the supply ship and trouble ships. Clerical work and all records. (Does not include mechanical force on planes or stewards department). The former is included under flying equipment and the latter under passenger service which will be on the cost basis). Station maintenance from data obtained from lighthship operation will be less than 7½ per cent of first cost. Applied to all floating equipment totaling 21 000 000 = 1,575 000. Station operation at 150 000 per year. Eight sea stations and two terminal stations = 1,500,000 a total of		$ 3,075 000

(6) *Insurance*
All flooding and terminal equipment (excepting flying equipment) totaling approximately $32 000 000 will take a rate not to exceed 5 per cent ..... $ 1 050 000

(6a) *Depreciation and Taxes:*
A combined rate of 7½ per cent on all property (less flying equipment) will be ample or 7½ per cent of $21,000,000 ..... $ 1,575,000

(7) *Administrative Expense*
Includes salaries of executives and other officials. Engineering Department clerical forces, branch office expense and advertising say 2½ per cent of gross business $1 712 500

(8) *Miscellaneous*
Unlisted operating expense ..... $ 1 837,500

Total ..... $ 26,000,000

SUMMATION

(1) Fuel	$ 8 304 000
(2) Piloting	2 078 000
(3) Flying Equipment	7,120 000
(4) Supply Station	3 075 000
(5) Insurance	1,050 000
(6) Depreciation	1,575 000
(7) Administrative	1,712,500
(8) Miscellaneous	1 087 500
Total Operating Cost per annum	$ 26,000,000
Gross Annual Income	$ 68 500 000
Gross Annual Operating Cost	26 000 000
Net Annual Income	$ 42 500 000

Rate of return on investment 108 per cent.

Doubling of traffic will increase capital investment of flying equipment only and add slightly to working capital required

Assume capital increased to $50 000 000
Twice the annual income $137 000 000
Twice the annual operating expense 52 000 000
Net Annual Income ..... $ 85 000 000

Rate of return on investment ($50 000 000) 170 per cent

As a check on the operating expense of the proposed service the operating cost of the United States Post Office Air Mail has been charted and compared with the estimate of the North Atlantic air route and is illustrated in Fig 6

What is the next step? Unfortunately the project is not one that can be started in a small way and gradually expanded. It must be all or none. Americans are used to big projects so with the knowledge of the practicability of the scheme will come the determination to "put it over." It should therefore be the object of every one interested in commercial aviation to promote discussion of the scheme which may eliminate many of the imaginary difficulties seemingly always associated with original conceptions, and bring about quickly airplane ocean transit, than which no other application would have such a stupendous effect on international intercourse and world civilization, and which would put aviation where it belongs as the foremost transportation medium developed by men

CHARACTERISTICS	STEAMSHIP				AEROPLANE	
	MAJESTIC	PER PASSENGER	LEVIATHAN	PER PASSENGER	VICKERS-23	PER PASSENGER
LENGTH	956		950		54	
BEAM	100		100		88	
DEPTH	102		118		17	
SPEED MPH	280		280		109	
PASSENGERS	4000		3400		23	
HORSE POWER	66 000	16.5 (HPH 23.7)*	60 000	17.6 (HPH 25.9)*	365	15.8 (HPH 15.8)*
TONNAGE **	56 000	14 (1 ton = 350 lb)	56 000	16.7 (1 ton = 300 lb)	5.16	22 (1 ton = 91 lb)
CREW	1000	0.25	1100	0.32	2	0.8
FUEL PER TRIP	5700	1.42	5700	1.67	764	33
TOTAL COST	$12000000	$3000	$12000000	$3500	$40000 est	$1740

* All tonnage estimates given in long tons of 2240 lbs
** HPH = Horsepower hours per passenger per trip

MAJESTIC 36 trips per year @ 65% capacity (2600 pass per trip)=70,000 per annum
AEROPLANE 25 trips per year (2550 miles per trip) full capacity = 1355 per annum or 40 aeroplanes on the Atlantic route will equal the Majestic in passenger carrying capacity at a investment cost of about $40,000,000

Fig. 5. Commercial characteristics of ocean steamers and transatlantic airplane

DISTRIBUTION OF OPERATING EXPENSE

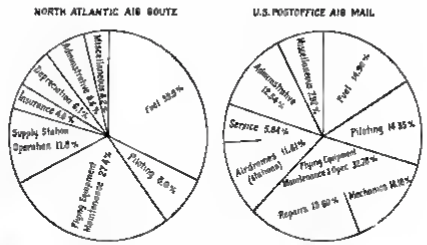

Fig. 6. Diagrams showing air line operating costs

PROPOSED FLYING SCHEDULES
Regular Service Speed 115 m.p.h
NEW YORK—PLYMOUTH
EASTERN PASSAGE

	Leave	Arrive	Elapsed Time	Distance
New York	6.00 a.m	Langley 9 30 a.m	3 30	400
Langley	9 45 a.m	Channie 1 15 p.m	7 15	800
Channie	1 45 p.m	Wright 3 15 p.m	11 45	1200
Wright	3 30 p.m	Maxim 5 00 p.m	15 00	1600
Maxim	6 30 p.m	Hoegrave 1 00 a.m	18 00	2000
Hoegrave	1 15 a.m	Benson 4 45 a.m	23 45	2400
Benson	5 00 a.m	Phillips 8 30 a.m	28 30	2800
Phillips	9 00 a.m	Rolls 12 30 p.m	32 30	3200
Rolls	1.00 p.m	Plymouth 4 30 p.m	34 30	3650
		(8 30 p.m. Greenwich Time)		

WESTERN PASSAGE

Plymouth	8 36 a.m.	New York	5.00 p.m (12.00 Noon New York Time)	34 30 3650

Note —Due to time difference of 5 hr between New York and London the apparent time of the ocean crossing will be 30 00. On the Eastern trip however by flying at the 12 000 ft. level the ground speed of the plane will be increased from 95 to 40 m p h Thus will reduce the apparent elapsed time to approximately 30 hr

Express Service Speed 150 m.p.h.
(Landing at every other station)
Eastern passage with 60 mile following wind

New York	4.00 p.m.	Plymouth	12 00* Noon
Plymouth	4.00 p.m.	New York	12.00* Noon

*Corrected for time difference
Apparent elapsed time of ocean crossing is 20 hr
Frequently the surface winds of the ocean are easterly so the regular schedule of 30 hr between Plymouth and New York will often be made in 24 hr and the express schedule in the same direction in 16 hr. This means leaving London at the close of a business day and being in New York at the beginning of the next.

The "Odic Ray"

An invention which is alleged to nullify the force of gravity is announced from Pasadena, Calif by Edgar L. Hollingshead, inventor and electrical experimenter. The invention consists in a new ray which Mr Hollingshead calls the "odic ray" and which he says he discovered after twenty years of experimentation. Its most spectacular property, he says, is the power to increase atomic speed in matter upon which it is focused. When the speed of the whirling atoms reaches a certain point, he explains, the pull of gravity has no effect on them.

When the use of the odic ray has been perfected, Mr Hollingshead predicts, any solid object on which it may be focused will float in air. Equipped with the proper apparatus for generating this powerful ray, he asserts, the airplane of the future could be built of steel and yet rise with the ease of a lighter-than-air craft.

Heat also accelerates the speed of the whirling atoms composing any substance. Mr. Hollingshead points out, but heat freely applied eventually transforms the solid into a gas. The odic ray, on the other hand, can increase the atomic speed tremendously without causing the disintegration of the solid, he said.

The action of a gyroscope furnishes an illustration of power of accelerated motion to offset gravity.

The Marine Corps Flight from Coast to Coast

Report on the Formation Flight of Four Martin Bombers From San Diego, Calif., to Quantico, Va.

The following interesting report on the formation flight of four Martin Bombers piloted by Marine Corps fliers from San Diego, Calif, to Quantico, Va, has been received from Marine Corps Headquarters.

Organization of Personnel

Plane T1 Maj Roy S Geiger, U.S.M.C, Commanding Flight. Capt. Francis P Mulcahy, U.S.M.C, pilots; Gun Sergt. Walter L. Pounders, U.S.M.C, mechanic

Plane T2 Capt. Arthur H. Page, U.S.M.C, Adjutant and Navigator, Sec. Lieut. Guy B Hall, U.S.M.C, Engineering Officer, pilots; First Sergt. Harry L. Blackwell, U.S.M.C, mechanic.

Plane T3 Capt James E Davis, Executive Officer, Capt. Russell A. Presley, U.S.M.C, Supply Officer, pilots; First Sergt Irvin M. Karns, U.S.M.C, mechanic and Sergt. William C Groves, U.S.M.C, carpenter.

Plane T4 Capt Louis E. Woods, U.S.M.C; First Lieut. Walter S. Hallenberg, U.S.M.C, pilots, Gun Sergt. Henry D Alcorn, U.S.C.M, mechanics

Note Personnel on April 20th changed as follows; Captain Presley to T4 and Captain Woods to T3

Planes paired were to watch each other in flight and in case one landed the following signals were to be used:

(a) Three men stand at nose of airplane Personnel O.K., but will be impossible to get plane off. Flight proceed.
(b) Three men stand at tail of plane: Flight proceed, will make minor repair and follow.
(c) Three make "L". Land in "L" and render assistance.
(d) Total crash. No planes to land, but proceed to nearest communication and report position of crashed plane. Then return to crashed plane

After routine inspection of planes on April 17, the four MT airplanes were given air tests by our personnel and accepted.

On April 18, the entire day was devoted to loading spares and emergency rations, checking up and final tests. At this time T4 developed more radiator trouble, but through the kindness of Lieutenant Smith, Army Air Service, repairs were made that night and everything put in readiness for the take-off next day.

At the Naval Air Station, every assistance was given by the Station and Operating Squadrons and our thanks are tendered to Capt. T T Craven, U S Navy, and those under him who so heartily aided our departure, especially Lieut. Arthur Gavin, U.S.N., Engineer Officer, who set and tested the airplanes. Two DeHaviland airplanes from the Fleet Observation Squadron escorted the Bombers through the Passes to Imperial Valley.

The Start

April 19—T1, T2, T3 and T4 left San Diego, Calif., from North Island. The clouds were apparently just lifting over the mountains with weather reports good. A loose formation was taken and T1, after attempting to get across the course, turned south paralleling the hills until she came to the Pass followed by the San Diego and Arizona R. R., and here headed up the valley. At 9.15 T1 went down at Tecate, Mexico, with a burned out generator and exhausted battery. The country looked impassible, but a successful landing was made. T1 signaled everything O.K., but unable to get out of the field. T2 continued up the pass, attempting to follow the San Diego and Arizona R. R., but the railroad ran into the clouds, so the valley was followed to the right. This led to a plateau surrounded by clouds and hills. After circling for about ten minutes the clouds lifted sufficiently to get out from the east. From here on, followed the San Diego and Arizona R. R. to El Centro and the Southern Pacific to Yuma, the trip was beautiful and the country near the railroad well cultivated, affording plenty of emergency fields.

T4 landed at 11.00, T2 at 11.20 and T3 at 11.25 a. m. T4 ran over a Foed car with the right wing in landing, taking off the top of the Foed and damaging the wing of the Bomber. At 2.00 p. m. T1 came in after replacing generator and battery, taking off down the mountain side. T1 had a better trip through the hills as the ceiling was then over 6000 ft. Airways information shows the field at Yuma 2300 ft. elevation—true elevation of this field is 130 ft. This field is very hard and a plane rolls for a long distance.

Repairing of T4 consumed the afternoon and well into the night.

On this leg, and from here on, we followed the track of the Southern Pacific R. R. as it was dangerous to attempt to cross the utterly uninhabited deserts of Arizona, New Mexico and Western Texas.

Red Crow gas service here very satisfactory from gas trucks.

Flying in a Sand Storm

April 20—Left Yuma at 7.45 a. m., and arrived Tucson at 10.34 a. m. All four planes functioned perfectly, the weather was beautiful and the country afforded plenty of emergency landing fields. Red Crow gasoline available from gas trucks. The field at Tucson is a municipal field and is excellent. T4 had a broken lead wire which was replaced by stranded wire with a tourniquet. All planes turned up at 1.30. T1, T2 and T3 took off at 1.35 p. m. and after waiting for T4 for about ten minutes, received the signal "Grounded, plane will follow do not need assistance", so with a strong tail wind and the Southern Pacific R. R. as a guide, we headed for El Paso, Tex.

At Deming, N. M., we encountered a sand storm at 7000 ft. This lasted until we were just outside El Paso, but as we could always see down, it did not bother the flying. It did eat our faces and fill our clothes and everyone was covered by the time we reached El Paso. We landed there in the roughest kind of air into a forty mile wind at 4.40 p. m.

The Army field at El Paso is excellent, and every assistance was given us. Received a wire from T4 that she would proceed in the morning.

It was originally intended to go from El Paso to Fort Sill via Pecos and Sweetwater, but information furnished by Air Service officer at El Paso strongly advised against going into the two fields, and the route was accordingly changed to San Antonio via Marfa and Del Rio. The fields at Sweetwater and Pecos were reported to be seldom used and to be in very poor condition.

April 21—T4 arrived at 11.00 a. m., having changed a burnt out generator.

All planes left El Paso at 1.50 p. m. The take-off was not without thrills, as the Bombers were heavily loaded and the heat prevented opening the motors. All planes settled somewhat after taking off and it was very difficult to keep them flying owing to the altitude and thin heated air. This leg was uneventful except for motors, which ran between 160 deg and 210 deg. and prevented climbing to a safe distance. The country afforded emergency landing fields all the way except in the Sierra Blanca area.

Arrived at Marfa at 4.20 p. m. Excellent field. Serviced planes that night. The First U. S. Cavalry was very hospitable and gave us every possible aid.

Army Air Service information showed the field at Marfa to be what is now used as the Cavalry drill grounds and would be impracticable for use as a field. The field has been moved to the north side of the R. R. track three miles from town. Marfa is 5000 ft. above sea level and some uneasiness was felt

on taking off. However, the following morning was cool and only a slightly longer run than usual was noted on the take-off.

Some Hazardous Flying

April 23—We left Marfa at 7.30 a. m. intending to go through to San Antonio. The first 50 miles was the worst experience of the trip. Only one plane could get over 500 ft. from the ground and two planes went down to 25 ft. in the Alpine Pass. This was due to the currents over the mountains and with motors running at 210 deg.—25 ft. of altitude made for extremely hazardous flying. At Lenox, just the reverse was experienced. All the planes went up to 2000 ft. in less than two minutes. From here on T1 went above the clouds which were scattered, but dropped below as they closed in to keep the railroad in sight. This country is absolutely desolate but there were only a few minutes when a forced landing could not be made with some degree of safety. After passing beyond Del Rio about ten miles, T1 led the formation back and landed as a change in wind made San Antonio doubtful on our oil supply. The landing was made at 10.50 a. m., on the R. E. L. Miche Drill Grounds as the Airways plot showed the field now in use to be covered with mesquite. The drill grounds are cut up with ditches and have cavalry obstacles but is a good landing field. T4 sprung a radiator leak which was repaired locally and T2 had a slight leak which was repaired on the field. The Fifth U. S. Cavalry loaned us men and transportation.

April 23—Left Del Rio at 7.30 a. m. A strong wind was blowing and the take-off was very difficult. Still following the Southern Pacific R. R. we came, after about twenty minutes, to the country, where except for one fence or two, the planes could be taxied to San Antonio. A good tail wind helped us on and we made Kelly Field at 9.45. Here we intended to make a good overhaul and found it badly needed. T2 changed a starboard motor. Six of the eight radiators were taken off for more or less serious leaks. These were repaired by the Air Service Intermediate Repair Depot who did a very nice job. The entire Post was apparently placed at our disposal so that by noon the following day all planes were ready to proceed.

The officers of the Air Service Intermediate Repair Depot gave a beautiful luncheon to the officers of the Marine Corps on April 24. Several of these officers had been on the Porto Rican flight and were very enthusiastic about their reception in P[illegible] and Santo Domingo by the Marines. Many thanks were tendered to the Commanding Officer and officers of Kelly Field for their hospitality and generous use of their facilities.

Storm Warnings

April 24—Left San Antonio at 2.15 p. m. Captain Langlin of the Air Service, U. S. Army, accompanied the flight showing us the best route which was pretty close to the railroad and landing over perfect flying country. Apparently one could land anywhere. The field at Dallas is perfect and is being operated by a Curtiss representative.

Storm warnings were received here but due to the position of two "Lows" in the vicinity, the weather bureau was unable to give definite forecast for the night.

April 25—The departure was delayed until 11.00 a. m. in an effort to get a [illegible]ather forecast. It was very threatening, with a small cyclone loose on the route the night before. However, after a few rain squalls, the planes ran out into good weather, arriving in Tulsa at 2.30—landing on a privately operated field, somewhat small, but with good approaches.

April 26—Left Tulsa at 8.20 and by staying just below the clouds a perfect trip was flown without a bump and over a country where a landing could be made anywhere from 200 ft. A nice tail wind helped our arrival at Kansas City at 10.50. The field at Kansas City is one of the Army Reserve Corps fields operated by Lieutenant Carroll, Army Air Service, who did everything possible for us.

The Aero Club of Kansas City tendered automobiles for use in sight seeing about the city during the afternoon and gave a delightful dinner party to our pilots in the evening at the Kansas City Club. We owe our thanks here for one of the most delightful evenings of the trip.

Three Hours in a Driving Rain

April 27—Left Kansas City at 10.35 a. m. and endured a most uncomfortable three hour trip in a driving rain which at times blanketed everything. At no time could we get over 300 ft. and see, and only by working all the time were the following planes able to see T1. All hands were thankful to reach Belleville at 2.10, landing at Scott Field. Broken radiator bracket on T2 was repaired by the Balloon Squadron, and three radiators were replaced by those shipped from Quantico ahead of our arrival.

We were fortunate in arriving at Belleville at the proper time to attend a dance given by the officers of Scott Field to the Aero Club of St. Louis. We hope to revisit this field during the Pulitzer Races next Fall.

April 28—Left Belleville at 1.35 in order to let the storm get to Indianapolis before the planes and after a beautiful trip without incident landed at 4.35 p. m., in the Army Reserve Field at Fort Benjamin Harrison which is slightly rolling, but generally excellent.

April 29—Left at 6.30 in perfect condition and a tail wind, with good fields everywhere. Landed at Wilbur Wright Field 8.05. After re-fueling left for Moundsville, West Va., at 10.10 over the Model Airway arriving at 12.10 with a tail wind and smooth air.

The End of the Trip

April 30—Left Moundsville at 8.45, encountering very smooth air. This is a difficult field for Martin Bombers. The trip across the mountains was very rough even at 6000 ft. T2 was forced down at Harper's Ferry with a water pump leak. Signalled "O.K. will follow". T1, T3 and T4 arrived in Washington at 11.00 a. m. where they were greeted by the Secretary of the Navy, the Commandant of the Marine Corps, the Chief of Bureau of Aeronautics, the Officer in charge of Marine Corps Aviation and other Navy and Marine Corps officials. Leaving Washington at 11.30 and arriving at Quantico about 12.15 p. m., where the planes were greeted by General S. D. Butler, the Commanding General of the Post, together with his Staff and the Post Band. T2 arrived at Quantico from Harper's Ferry at 1.05 p. m.

North Central Aviation Co.

The North Central Aviation Co. of Marceline, Mo., reports that it has had a very successful business season last year, with orders for supplies steadily on the increase. Flying operations last season were carried on without a single accident, not even knocking a propeller off. The firm is planning to put on a flying chens of several ships during the summer, and also to give flying instruction, besides selling supplies, including airplane oil.

The company owns a landing field 4 miles NE of Marceline, Mo., which is hard blue grass sod, one half by one quarter mile. Ships can land and take off in any direction, there being no obstruction around it. The company also has the use of another landing field one mile North of the town.

R. W. Shrock is chief pilot and engineer, and Marvin Block is assistant pilot.

London-Berlin Airway Opened

The London Berlin airway was officially inaugurated April 30, last, by a DH34 of the Daimler Airway Co. which made the trip of 750 miles in eight hours. The through fare from London to Berlin is $30, which is only 4 cents per mile. Passengers wishing to go to Moscow can take at Berlin the night train for Koenigsberg, whence a direct airway service is run by way of Kovno and Smolensk to Moscow. The total running time between London and Moscow is 36 hr.

The London-Berlin airway is to be jointly operated by the Daimler Airway Co. and the German Aero Lloyd.

Geology as an Aid to Air Navigation

By Wing Commander M. G. Christie

Air Attache, British Embassy, Washington, D. C.

In the article which follows Commander Christie deals with geology from the airman's point of view. The author has made an extensive study of this subject and the result which he has obtained will undoubtedly have an important bearing on air navigation of the future.

Dr. W. A. Mendenhall, Chief Geologist of the United States Geological Survey, in commenting on the utilization of geological maps by pilots, writes as follows:

"One task of the geologist is to distinguish one type of rock or one geologic formation from another and to map the various types. Many of his distinctions are based on minor characteristics which could not be recognized at a distance, others are based on very striking differences which can easily be distinguished from great heights. The geologist recognizes differences of both kinds, but in regions where rock distinctions of the more conspicuous type exist he could prepare a geologic map on which these distinctive formations would be shown. Such a map should be as good a guide to the airman as a map showing features more commonly recognized as of use to the aviator, such as cities, waterways, mountains, shore lines, railways, and highways.

"In many parts of the United States there are belts of rocks of distinctive colors and characters, there are soft rocks which always give valleys, hard rocks which form ridges or plateaus; there are horizontal rocks which lead to one type of topography, and folded rocks which lead to an equally characteristic but very different type of topography. These differences have been observed by Commander Christie and utilized by him in Great Britain. They are equally capable of recognition and utilization at least in parts of the United States, but the possible usefulness of the geologist to the airman has not heretofore been emphasized in this country. Commander Christie directs attention to it. It is a promising field for future development.

"Commander Christie and others who have thought along these lines emphasize the point that air photography gives the only adequate means of recording the observed facts and conveying them to others. In passing rapidly over a region the fleeting glimpse obtained may soon be forgotten but by means of the photographs views which the observer on the wing obtains are made permanent for leisurely study. The airplane and the air camera have become instruments of great value to the map makers and to other students of earth features."—Editor

My acquaintance with geology is unfortunately only rudimentary and I venture to think that few of us airmen possess more than a very superficial knowledge of this science, but I shall try to illustrate briefly how in the ordinary course of our flying duties by the easy acquisition of a few facts and principles we can employ a certain portion of the geologists' work greatly to our practical benefit. Here however I must tread cautiously as my personal experiences only bear relation *to the ground surface conditions* as they exist in *England* though I am hopeful that the same principles will prove applicable at least to some areas on this continent.

England including Wales covers an area of about 60,000 square miles. Approximately two thirds of the country's surface lies at less than 500 ft. above sea level. The only areas that might be classed as mountains are the Pennine Chain in the N.W., the Cambrian Mountains in Wales, and the Devonshire Hills in the S.W. and in these the highest point only reaches approximately 3600 ft. In the Center and South the country is largely undulating pasture land, in the East, flat and under cultivation. Rivers are plentiful but shallow, narrow and winding; there are no *forests*, while woods cover only about 5 per cent of the country's surface, most of the mountainous areas being rough treeless moorland. Rows of trees, hedges and loose stone walls are freely used for marking the division of agricultural property. The cornfields of course represent areas of industry, the main five manufacturing districts being those centered around Manchester, Sheffield, Newcastle, Birmingham and South Wales.

It would seem that the navigation of aircraft over England should be easy enough if the average condition of the atmosphere were as favorable as it is in this country, unfortunately, as an American once aptly remarked, "England has no climate, only weather", in other words, most of the time low clouds overcast the sky, fogs and mists are prevalent between the fall and the spring, while on hot summer days a thick haze very frequently permeates the lower atmosphere. We have to deal therefore generally either with low ceilings or low visibility and these conditions make "finding one's way" at times quite an art. When making a cross-country flight it is of course highly advantageous to fly by compass but when atmospheric conditions are bad, when one's time and one's gasoline supply are limited, a frequent "check up" by means of a map often spells the difference between success and failure, in fact, however perfect the means of navigation may become, pilots will always be well advised to carry maps on board their aircraft. Needless to add from a military point of view, efficiency in map reading is an essential qualification for an airman in time of war when he must study and memorize in minutest detail the areas in which the enemy are operating.

Landmarks Shown on Survey Maps

The types of landmarks shown on geographic survey maps, and normally used for "checking up" from the a[illegible]ary of course in the different countries. In England, towns, railways and woods are usually picked out as being the most helpful to orientation, the smoke from the first named is frequently visible for miles. Our railroad tracks are kept clear of weeds and therefore readily catch the eye. English woods are mostly isolated and present characteristic shapes. Roads show up poorly since they are of a winding nature and hidden by thick hedgerows and trees—moreover the practice of tarring them has made them even less conspicuous.

Though aerial navigation is made relatively easy in highly civilized and well populated states and districts by the abundance of artificial landmarks, there exist many large tracts and areas that are as yet almost undeveloped though they have been both geographically and geologically surveyed. Such areas are increasing daily now that aircraft is assisting the surveyors to push farther afield a[illegible]complete their work in so much shorter time. These artificial landmarks are few and far between and we must look to nature alone to reveal distinctive features that will help us "check up" our course and that is where I feel geological maps come to our assistance.

Here I will divert for a moment to mention an interesting empirical method of orientation that was introduced by the Intelligence Section of the R.A.F. toward the end of the late war and was issued in the form of a book entitled "Characteristics of the Ground and Landmarks behind the Enemy Lines opposite the British Front." It was the product of an exhaustive study of numerous aerial photographs of the enemy's territory and illustrated the different appearance of various areas viewed from altitudes of 10,000 to 15,000 ft., the idea being to enable pilots to check their bearings roughly even if they could only see the ground at intervals through gaps in the clouds, thus the pattern represented by the mosaic of

fields, fences, and trees, was likened in one case to "Patchwork Quilting", in another to "Honeycomb", in a third, where the fields were rectangular and homogeneous, the pattern was called "Crystalline" and again where symmetry was entirely lacking the complimentary title of "Futurist" was used

This attempt at facilitating air navigation by photography was of considerable assistance to war operations, but the system is of course too expensive to extend under peacetime conditions—moreover there is rarely any necessity to fly across country at heights exceeding two to three thousand feet above ground level, and from these low altitudes the country below bears a very different aspect, many more details being visible, such as surface contours, types of strata, species of vegetation, colour of the soil, etc

Qualitative Analysis of Scenery

The qualitative analysis of scenery is the one aspect of geology which I feel is going to be of considerable value to airmen. After a systematic series of flights over almost the whole of England, I can state without exaggeration that geological maps place an entirely new set of landmarks at our disposal. This fact has been long known to geologists. Lord Avebury in his book on "The Scenery of England", published in 1904, states as follows: "Anyone who crosses this country with a geological map in his hand will observe that the aspect changes as he passes from one geological formation to another". These formations differ from each other both physically and chemically, the physical contrasts reveal themselves in the contours and in the color, texture and cleavage of the exposed strata, the chemical characteristics betray themselves indirectly through the species of vegetation which they sustain.

Almost every airman is conversant with the appearance of the main types of strata, *white chalk*, small of fracture and powdery; the dull cheeselike aspect of *clay*, the characteristic cube fracture of *limestone*, the gritty stratification of *sandstone*, the superimposed laminations of *slate beds*, the smooth crystalline appearance of *granite* and so forth. I found the exposures of strata in England far more frequent and far easier to distinguish from the air than I had anticipated and after a little practice I was able to identify the general nature of many rocks from distances exceeding a mile flying at 3,000 ft in normal visibility. I remember once coming down through a bank of clouds and picking up a limestone buttress over 10 miles away, but in this case I was undoubtedly helped by its contour.

When looking for exposed strata, the airman must be warned against drawing conclusions from the appearance of the top soil, since, the latter, though usually *a product* of the substrata, has undergone complete physical and chemical changes through the action of the elements and the admixture of organic matter. There are instances in England however where the soil tells a useful tale, namely in the Permian and Triassic formations where the rich red tint of the ploughed fields can be seen for miles around, and *on the Chalk*, where the surface of the soil is invariably covered with numerous flints. Now, the contours for certain formations in England are very characteristic, for instance the areas covered by Alluvium are entirely flat, the chalk forms smooth rolling country, the Oolite limestones present well defined plateaux shelving down abruptly; the Archaean formation always appears in rounded humocky hills which look as though they had been cast or molded on the spot; the granite country is rugged and strewn with large boulders, and so forth. These are some examples of geological formations whose contours are so typical that once seen from the air they can never be confused with each other.

Clues from Local Buildings

Another thing that struck me forcibly was the extent to which local buildings reveal valuable clues. It can be broadly asserted that, in England at any rate, the materials employed in the construction of rural buildings such as farm houses, etc, are those which have been obtained locally either from the underlying or adjacent strata; thus, for example, the rich red brick dwellings with red tiled roofs and the red sandstone village churches of the Midlands betray the vicinity of Triassic or Permian areas. Farms of brick structure denote a marl or clay district while the grey stone villages of the limestone country and the flint stone churches on the Chalk clearly indicate their geological environment. Indirectly too we can "check up" in a similar manner when we sight collieries, brickworks, limekilns or cement works in the open country. Again, the loose stone walls we use in England in the division of agricultural property differ in their material composition according to the nature of local quarry supplies.

Help of Vegetation and Agriculture

I will now briefly touch upon another aspect namely that of vegetation and agriculture. It is not surprising to find, when one considers the big chemical and physical differences between the various strata, that the vegetation sustained by the one frequently differs both in type and in degree of luxuriance from the other. In England deciduous trees, especially oaks and elms, seem to thrive on the marls and clays, while coniferous, ie pines, firs, larch, etc, usually accompanied by gorse and brambles are predominant on silica beds such as the Bagshot sands of the Eocene and the Lower Green sand of the Cretaceous. On the limestone formations, vegetation is found in profusion in the river valleys but not on the plateaus, on the Chalk the trees appear usually in clumps, thinning, it is stated, only where pockets of flinty clay have collected through denudation, while on marls and clays trees are scattered everywhere. On the shales and grits the vegetation becomes visibly coarser and stunted in growth.

There is doubtless a close connection between geology and agriculture but in that respect I confined myself to noting down the average sizes and surface conditions of fields in the various areas with a view of course to discovering the relative facilities which each formation offers to airplane pilots suddenly forced to descend and for the establishment of new landing fields. I found in England that by far the best and most suitable landing opportunities are offered by the country overlying rocks of a porous character. Despite the disturbing influences of our long sequence of land tenure laws upon the natural division of property, the rule seems to hold good in agricultural areas of a flat or undulating nature that *the more porous the strata, the lighter the soil and the larger the field*; thus cultivated fields on the gravels, on the Lower Oolite limestones, and on the Chalk average probably treble the size of those on the clays or shales; this is presumably based on the fact that the heavier clay ground requires ditches for drainage at short intervals; in addition the surface of the fields on the marls, shales and clays have been ploughed on the ridge and furrow system which makes the successful landing of an airplane much more difficult.

These then are some of the surface features of England visible to the airman which I collected in a very amateur way and put together in a schedule or index for use with Geological Survey maps to aid the identification of each of the formation areas.

There are two other lithological types I should like to mention, one useful, the other somewhat troublesome: the first are the intrusive rocks mainly of igneous or volcanic nature which have thrust themselves up through cracks or faults in the surface strata and crop out in all sorts of places, they sometimes present very helpful landmarks as for instance in the North of England where whinstone and dolerite throw up long low dykes in straight lines across the country.

The second are the so-called *Drift* Boulder Clays and Gravels, extraneous deposits carried from a distance and spread over certain parts of England by the glaciers of the Ice Age, where such deposits were laid in thin layers they have effected little alteration and have been more or less assimilated by the original solid formation, but where as in parts of the Eastern Counties, the Drift Clays and Gravels have been plastered locally in thick layers, they have effectively masked the original scenery sometimes over areas of several square miles.

How Geology Helps the Pilot

Let me now briefly summarize *what practical assistance* I consider geological maps and indexes of this nature will give to cross country fliers, always assuming the geological conditions to offer a certain amount of the variety and change that is so apparent in Great Britain.

1. A brief study of map and index before leaving on a long cross-country flight besides affording the pilot an abundance of conspicuous landmarks, will give him a complete forecast of the types of country to be crossed. If weather conditions or technical considerations are such that he wishes as far as possible to avoid closely timbered, rough or otherwise unfavorable areas, use of the index will frequently allow him to select a route that will pass over a maximum area of ground favorable to forced landings without any previous personal acquaintance with the geography of the country.

Checking Bearings from Landmarks

2. After a little experience with the practical adaptation of geological maps, an airman should be able to check his bearings enroute by scenic landmarks alone. In England in many cases one formation abutting its neighbor forms a line of demarcation as distinct when seen from the air as any coastline. Any normally intelligent pilot would be able after a few flights to discard all else and find his way by geological maps alone.

3. Even over well-developed countries, a pilot descending through banks of clouds after having been cut off from the earth for some time will frequently encounter great difficulty in reconstructing his whereabouts merely from geographical survey maps, with a geological map, however, after glancing at the type of scenery below, he should be quickly able to narrow his likely position down to one or two alternative areas at worst and then verify by recognizing definite landmarks or by sighting a neighboring formation.

4. From a military point of view the possession of geological maps and indexes should be of no small value to an Air Force Commander in the Field by aiding him to select the best available areas for the establishment of his air bases and advanced landing grounds and by informing him of the likely locations of the enemy Squadrons or if the latter have no choice, of the difficulties they will be encountering.

5. The work of the Geologist too can be useful to commercial aviation by helping in the layout of airways especially as regards routes to be selected for night flying where a straight compass course is not always to be recommended but rather one which reduces the risk of a forced landing en route to a minimum.

Finally, I must emphasize once more that this study merely applies to conditions in England. I have no knowledge as to whether some of the principles outlined may be applicable in a modified degree to parts of this country or whether they will be found quite useless. I do, however, venture to recommend to American fliers *not* to treat geology as purely food for highbrows but to try and extract practical benefit from what is a very interesting section of science.

Pilots' Geological Index

Examples of representative geological formations to be used with geological maps are given in the tabulation which appears on the bottom of this page. Pilots, ones familiar with the geological characteristics can recognize from a geological map their location in the same way as they do now from geographical maps. Aerial oblique photographs of the typical scenery of each formation should accompany the index.

EXAMPLES OF REPRESENTATIVE GEOLOGICAL FORMATIONS TO BE USED WITH GEOLOGICAL MAPS

GROUP AND FORMATION	LITHOLOGICAL CHARACTER	TYPICAL SCENERY	REMARKS
VI Upper Eocene Comprising Bagshot Sands.	Mainly sandy sometimes sandy clayey and loamy yellow to brown in color exposure of strata occurs frequently	Rough broken country closely timbered with pinetrees and vegetables generally of coniferous and prickly nature. Rough sandy aspect of heath and gorse scrub of frequent intervals. The highest point only reaches 450 ft. above sea level.	Has a dark appearance from the air easily distinguishable from the adjacent lying formations Chalk and Lower Eocene. Very unfavorable country for airplane landings. Typical Examples The New Forest and the country N E of Farnborough Hants. This formation is free of Drift.
II Alluvium	Silt, gravel and in some places peat. Exposures of strata are rarely visible.	Where the Alluvium appears in narrow strips alongside rivers it consists usually of flat green pasture land and meadow. Its widest areas comprise flat rounding, rarely more than 100 ft. above sea level with large and small drift partly under cultivation partly pastures no woods, few trees, occasional peat bogs dykes or low hedges divide property. The lower lying areas are usually marshy in winter.	The riverside Alluvial strips which exist in so many English valleys are very conspicuous from the air by their flat and green appearance the expanse of flat rectangular fields intersected by straight dykes enables the more extensive areas also to be easily identified landings can be effected on the Alluvium country without marsh difficulty, especially where hurdheath or gravel prevail. Typical examples of Alluvium South East Lincolnshire the Vale of York and Romney Marshes.
XXIV Culm.	Mainly dark colored Shales and Grits. Exposures are not often visible from the air the strata are folded and contorted.	The Culm Measures rise into a very limited area of moorland around Dartmoor just reaching 1,000 ft. above sea level at highest point. The remainder (practically nine-tenths of the formation) forms some of the most unopen country in England. The country is rather monotonous, marsh pasture tiny square fields rarely covering more than three to four acres each separated by unsightly thick high hedgerows free of trees and often planted on raised banks no ridge and furrow visible. the country is free of scattered timber but relatively well wooded with deciduous trees.	The Culm is almost entirely confined to Devon-North Cornwall, perhaps fortunately so for the aerial traveller as it appears nowhere to offer a sufficiently large patch of suitable ground to insure a safe landing by airplane.
XXX Igneous and Bedded Volcanic Rocks.	Granite Andesite Basalt, Whinstone and all other intrusive plutonic rocks. The strata are almost more frequently exposed than covered.	The uncultivated areas of these rocks in Britain is confined to the mountains of Cumberland and Westmoreland, the Cheviot Hills in Northumberland and the rocky moors of Cornwall and Devon. Bare rocky mountain scenery; rugged craggy hills with precipitous cliffs and marsh screes in the Andesite areas of the North. In the South high rough moorland strewn with granite boulders, dry treeless hilltops of weathered granite. Vegetation is scarce and coarse.	The mountainous areas of the Igneous Rocks have not yet been fully studied from the air Besides these there are numerous thin outcrops of intrusive rocks in various parts i e., the Dolerite Sills, the Whinstone dykes and bosses straddling in long narrow strips across the northern counties of England these should be visible and act as useful landmarks. The main areas of the Igneous Rocks are easily recognized and quite unlike those of any of the previously described formations. Granite is easy to distinguish. The Andesites might be mistaken for flints or shales. As regards airplane landings all the tracts of the Igneous Rocks are practically impossible to negotiate.

Howard E Coffin, Pres. R.H. Mulvihill, V Pres. A F Castle Treas. John B Coleman, Rec Sec.

Official Bulletin of National Aeronautic Association of U.S.A.

Col. H E Hartney, General Manager Cable Address, Nataero
National Headquarters, 26 Jackson Place, Washington, D.C

The National Aeronautic Association of U.S.A. assumes responsibility for the statements under this heading

Since the last bulletin printed through the courtesy of the Editor, the chapter movement in the membership plans of the Association has made gratifying strides. The activities are listed by Districts

First District

Requests for the formation of chapters from this District have reached national headquarters from the Mayor of Boston, William P Shuffield of the Chamber of Commerce of Newport, R I; from the Chamber of Commerce of Providence, R I, while Frederick K Harris, President of the Aero Club of Vermont, states that the Aero Club will be changed to a chapter of the N A A New Haven has also applied for a charter for a chapter in that city

Second District

Applications for chapters have been filed from Paterson, and Montclair, N J., Rochester, Albany, Gloversville, Binghamton, Newburgh, and Watertown, N Y

Third District

Applications have reached headquarters for the formation of chapters from the following cities —Allentown and Pittsburgh, Pa.; and from Richmond, Danville, Roanoke, and Suffolk, Va, these cities and towns having undertaken the formation of chapters.

Fourth District

Chapters are being formed in Atlanta and Columbus, Ga., Montgomery and Birmingham, Ala; Tuscaloosa, Miss.; Pensacola and Tallahassee, Fla, Macon, Ga., Natchez and Pascagoula, Miss; Statesville and Spartansburg, S C; and Chattanooga, Tenn

Fifth District

Chapter activities are under way in Indianapolis, Vincennes, and Fort Wayne, Ind; Louisville, Ky; Akron, Lorraine, and Painesville, Ohio, also in Xenia and Dayton, Ohio; and in Wheeling, West Va

Sixth District

Chapter organization is now going on in Monmouth, Ill; Battle Creek, Detroit, and Wyckston, Mich; and in Milwaukee, and West Bend, Wis.

Seventh District

A chapter has been formed in Davenport, Iowa, and others are being formed in Duluth, Minneapolis and St. Paul, Minn, St Louis and Kansas City, Mo, Waterloo, Des Moines and Cedar Rapids, Iowa; and Omaha, Neb

Eighth District

Chapter activities are going on in Prescott and Phoenix, Ariz; Ft Collins, Colo; Elreno, Okla, Dallas, San Juan and San Antonio, Tex, the chapter at San Antonio will be one of the largest in the south, over 300 members having already joined this chapter.

Ninth District

Chapter formation is going on in Anaheim, Glendale, Pasadena, Sacramento, San Diego, San Francisco, and Los Angeles, Calif, Helena and Wolf Point, Mont.; Eugene, Ore.; Sheridan, Wyo; and Seattle, Wash

These additions to previous lists show chapter activities in 147 cities and towns from the Atlantic to the Pacific coasts and from the Canadian border to the Gulf of Mexico

Shrine Conclave

Three hundred thousand Shriners from all over the United States will attend the Shrine Conclave in Washington the first week in June Through the activities of the Association, the following organizations will stage what will probably be the largest aeronautical show ever held in the United States: Army Air Service; Bureau of Aeronautics of the Navy, Post Office Department, Weather Bureau, Bureau of Standards, and the Smithsonian Institution

On Monday, June 4, the Post Office Department and the Weather Bureau will hold exhibitions from 10 a. m. to 2 p m. On Tuesday, June 5, from 10 to 2 the Navy will conduct educational exhibitions of aeronautical activities in naval aviation It is expected that the aircraft carrier, Langley, will be in the Potomac and that bombing and torpedo dropping, smoke screen work and other purely naval aviation maneuvers will be carried out, and, in addition, the Marine Corps fliers will take photographs from the air, develop them in the air and drop the prints down to the crowd below

On Wednesday, the 6th, the Army Air Service will carry out all kinds of aerial maneuvers incident to the wartime use of aviation and in this connection, Gen H H Bandholtz will stage with the military forces, ground operations on the Monument Lot in cooperation with the Air Service

Thursday will be aviation day at the Bureau of Standards and Friday, aviation day at the Weather Bureau, and, throughout the entire week, the Smithsonian Institute with its remarkable aviation exhibition, the Weather Bureau and the Bureau of Standards will be open to visitors Consequently, the entire week will present a program along educational lines so that the business men represented by the Shriners will have first hand opportunity of inspecting the governmental air services and their activities and, it is believed, that the concrete evidence of aeronautics as a factor in the industrial life of the nation and as a vital adjunct to the national defense, will be better known

Gulf to Canada Non Stop Flight

A 1400 mile non stop flight from the Gulf of Mexico to the Canadian border was successfully accomplished on May 26 by Lieut Harrison G Crocker, A A S., who covered the distance in 11 hr 54 min

Flying the special DH4 plane on which Lieutenant Doolittle made the one-stop transcontinental flight from Pablo Beach, Fla., to San Diego, Calif., on Sept. 4-5, 1922, Lieutenant Crocker left Ellington Field, Houston, Tex., at 5 21 a. m. (C T) and landed at Selfridge Field, Mount Clemens, Mich., at 6.15 p. m (E T)

Montreal Airport Discontinued

Notice to Airmen No 2 (1923) issued by the Controller of Civil Aviation in Canada advises that the public customs airport situated approximately 7 miles N. of the city of Montreal, P. Q, is no longer for use as a licensed airport

New Weight Altitude Record

M. Gontard, a French military aviator, on May 3 broke the altitude record for a machine carrying a load of 550 pounds by rising to 8,000 meters (approximately 26,250 ft.)

"If war were declared to-morrow what would we do for aircraft?"

Air Mail Summer Schedule

Beginning with May 15 the Air Mail Service inaugurated the following summer schedule on the transcontinental airway:

Westbound—Lve New York 6 45 a m, arr Bellefonte 9.20 a. m, lve Bellefonte 9 40 a m, arr Cleveland 12 noon Distance 435 miles. Mail load 500 lb max

Lve. Cleveland 9 a m E T, arr Bryan 10 a. m C T, lve. Bryan 10 20 a m, arr Chicago 12.35 p m Distance 335 miles. Mail load 500 lb max

Lve. Chicago 6 a. m, arr. Iowa City 8.10 a m, lve Iowa City 8.30 a m, arr Omaha 11 15 a m Distance 425 miles. Mail load 500 lb max

Lve. Omaha 1 p m, arr North Platte 4 15 p m Distance 245 miles. Mail load 500 lb max

Lve North Platte 7 30 a m M T, arr Cheyenne 10 15 a. m., lve. Cheyenne 10 35 a. m., arr Rawlins 12.30 p m, lve. Rawlins 12 50 p m, arr Rock Springs 2 15 p m Distance 455 miles Mail load 500 lb max

Lve Rock Springs 5 15 a. m., arr Salt Lake 7.50 a. m. M T Distance 155 miles Mail load 400 lb

Lve Salt Lake 6 30 a m W T, arr Elko 8 45 a m., lve. Elko 9 a m., arr Reno 12 noon, lve Reno 12 15 p. m., arr San Francisco 2. 15 p m Distance 630 miles Mail load 400 lb max

Eastbound—Lve San Francisco 2 30 p m W T, arr Reno 4 30 p m Mail load 400 lb max

Lve. Reno 6 30 a m W T, arr Salt Lake 11 30 a. m Mail load 400 lb max

Lve. Salt Lake 7 15 a m M T, arr Omaha 12 30 p m C T Mail load 500 lb max

Lve. Omaha 8 a m C T, arr Chicago 1 p m. Mail load 500 lb max

Lve. Chicago 12 noon C T, arr Cleveland 5 10 p m E T Mail load 500 lb max

Lve Cleveland 6 30 a. m E T, arr New York 11 35 a. m Mail load 500 lb max

Note—In the eastbound schedule the intermediate stops shown in the westbound schedule were omitted, as the arrivals and departures indicated in both schedules are for reference only As a rule ships leave intermediate stations as early as possible after being serviced.

New York to Langley Field in 2 1-2 hr.

The following additional particulars are on hand regarding the fast flight of the Loening Air Yacht on May 14 from New York to Langley Field, which was briefly reported in our last issue

This flying boat which is one of eight ordered by the Army Air Service, seven of which have been delivered, left the Army base at South Brooklyn at 10 15 a m carrying on board Lieut. Charles B Austin, A S, pilot, Grover Loening, designer of the ship, and Sergt. Widecamp, mechanic, in addition to 80 gal. of gasoline and 140 lb. of miscellaneous supplies and baggage

The day was clear, with a gentle NE wind blowing, and the Loening Air Yacht rapidly climbed to 2000 ft altitude which it maintained throughout the trip Sea Bright was passed at 10 24, Asbury Park at 10 29, Barnegat at 10 45, Atlantic City at 11 01, Cape May at 11.22, Ocean City, Md., at 11 46—where the wind changed to full East—Broon Brook at 12.01, Quimby, Va, at 12 20, and at 12 45 the ship landed off Langley Field, Va The airline distance of 306 miles was thus covered in 2½ hrs, or at an average speed of 122 m p h., which is an excellent performance considering that half of the way a steady eastern wind was blowing.

The following day Lieut Karl Cover, A S, pilot, Col William Sherman, Mr Loening and Sergeant Widecamp flew from Langley Field to Hampton Road Naval Air Station to demonstrate to the naval pilots of that station the flying performance of the Loening Air Yacht.

Italy Ratifies International Air Convention

The Italian government on March 14, 1923, ratified the International Air Navigation Convention, the provisions of which came into force for Italy on April 23, last.

The Convention is now in force in the following countries: Belgium, Bolivia, British Empire, France, Greece, Italy, Japan, Persia, Peru, Portugal, Siam and Yugoslavia

The International Commission for Air Navigation recently requested the Council of the League of Nations to bring its influence to bear upon those member nations which signed the Air Convention on Oct 13, 1919, in Paris, but have so far failed to ratify it, to do so at the earliest moment. These countries are Brazil, China, Czechoslovakia, Cuba, Ecuador, Guatemala, Hedjaz, Poland, Rumania and Uruguay.

On the other hand, it is expected that several countries which remained neutral in the war of 1914-18 will shortly adhere to the Convention They are the Netherlands, Spain and Switzerland These countries raised objections to Article 5 of the Convention, which made it impossible for a contracting state to allow flight above its territory of an aircraft belonging to an non contracting state, except by means of a special and temporary authorization

This restriction greatly hampered the development of European air traffic for under its terms if Holland, for instance, were a party to the Convention it would have to prohibit German aircraft from flying into Holland and so risk reprisals on the part of Germany British and French air transport circles promptly realized the handicaps this arrangement entailed, and upon their representation an amended wording of Article 5 was drawn up last summer, and approved at the first session of the International Commission in October, 1922 By the new article contracting states have freedom to make agreements with non-contracting states as long as these agreements do not infringe the rights of the contracting states and do not clash with the provisions of the Convention. It may be said in passing that the American and Canadian representatives made a reservation to this effect at the time of signing the Convention The amendment to Article 5 has since been drawn up in the form of a protocol which is now in process of being ratified

Another provision of the Convention to which several countries object is Article 34, under which the voting power of members of the Commission is such that the United States, the British Empire, France, Italy and Japan would always have a majority if they voted together The small nations took exception to this article and the question of modifying it is now being considered by the Commission

French Grand Prix Balloon Race

The start of the international balloon race for the Grand Prix of the Aero Club of France which took place May 13 at the Tuileries Gardens in Paris suffered from very adverse weather

Twenty balloons representing Belgium, France and Italy were entered in this contest which was to be the greatest lighter-than-air event since the last Gordon Bennett Race. The pilots representing France were MM. Gaston Fleury, Georges Blanchet, Cormier, Moineau, Bourdariat, Leo Nathan, Claude Lefebvre, Duval, Jules Dubois, Seratzky, Laporte, Leon Maison, Charles Dollfus, Henri Kapferer, Heutte and Charles Crombee Belgium was represented by MM Demuyter Veenstra and Labrousse, and Italy by Capt Ugo Medori.

Shortly before the time scheduled for the start a squall struck the Tuileries Gardens and wrecked five of the French balloons. The other pilots had great difficulty in getting away, some narrowly missing being smashed against the walls of the Tuileries Palace The north to northeastern winds which were blowing at the start, would have taken the aeronauts into Germany or Russia, where they would be liable to arrest, for which reason all decided to land in France Rene Moineau won the race according to preliminary reports.

"If war were declared to-morrow what would we do for aircraft?"

New F.A.I. Ruling Regarding Contest Officials

The 1921 Michelin Trophy Dispute

Our readers may recall the long drawn controversy between the Aero Clubs of France and Italy as to who should be awarded the Michelin Trophy for the year 1921. Some recent F. A. I. rulings on this thorny question with respect, in particular, to the functions of contest officials, have a very important bearing on the aeronautical sport in this country, where the National Aeronautic Association sanctions aeronautic events under authority from the F. A. I. Therefore, the Franco-Italian controversy will be recapitulated below together with some comment on the possible consequences of these rulings.

Briefly resumed the controversy arose from the following. The rules for the 1921 Michelin Trophy specified that contestants had to cover a circuital course 3000 kilometers long, with fifteen obligatory landings, and return to the place they started from. For this purpose circuits were laid out in both France and Italy by the respective Aero Clubs.

Edmond Poirée, a French pilot, covered the French circuit as prescribed by the rules in 37 hr. 13 min., and the Aero Club of France declared him provisional holder of the 1921 Michelin Trophy. Somewhat later the Italian Captain Martinetti covered the Italian circuit in 35 hr. 45 min., but as his starting place had in the meantime been flooded by a rainstorm he only circled over it and landed at a nearby field. He stated that the contest officials stationed at the starting field had signalled him to do so. This evidently involved the responsibility of the contest officials and the question naturally arose whether they had authority under F. A. I. rules to change the regulations of a contest, and if they had, whether such an infringement did not render the contest void.

The Italian Aero Club seemed to have certain misgivings on this subject, for although Martinetti's performance was made in the summer, it was not homologated until the close of the year, when Captain Martinetti was declared winner of the trophy.

The Aero Club of France immediately protested, pointing out that the long deferred homologation of Martinetti's performance had given ground for the view that the Italian flier had failed to better Poirée's performance, and that as a result no further attempt was made in France in view of the Michelin Trophy. The French club also took the stand that since the Italian flier had not covered the circuit as prescribed by the rules, his performance could not possibly count. The Italian Aero Club took the opposite stand, declaring that the change in the final landing place had been made for reasons of safety and that the contest officials had the right to do so. As both clubs held their ground, it was finally decided to submit the question to the arbitration of M. Ruiz Ferry, president of the Royal Aero Club of Spain. The latter awarded the decision to France, but the Italian club appealed from this decision to the F. A. I.

The F. A. I. discussed the whole question at its annual meeting held at Rome on Oct. 13, 1922, and adopted by majority vote the following decisions:

"1. Contest officials are authorized to prohibit, whenever they deem it necessary, a contestant from landing in a contest or trial which prescribes obligatory landings.

"2. Such prohibition shall not deprive the contestant of the right of having his performance declared valid."

As a result of these decisions of the F. A. I. Captain Martinetti was declared winner of the 1921 Michelin Trophy. However, the Aero Club of Spain, whose arbitral decision was thus reversed by the F. A. I., convoked an extraordinary meeting of the F. A. I. at Paris, on March 20, 1923, to reconsider the whole question in its relation to future contests. At this meeting the F. A. I. carried the following resolution:

"Contest officials have no right to modify, even in the slightest degree, the regulations of a contest."

As this resolution practically annulled the two previous decisions of the F. A. I., the Aero Club of France has awarded Pilot Poirée its Gold Medal and a prize of 20,000 francs, which is the sum he would have received as the winner of the Michelin Trophy.

Now, with respect to this controversy the following remarks suggest themselves. The F. A. I. ruling authorizing contest officials to prohibit a contestant from landing at an obligatory stop appears eminently sensible when it is done in behalf of safety, but it seems absurd that a contestant should be entitled to have his performance considered valid if it is not carried out in strict accordance with the racing rules. This view was editorially expressed in the Jan. 8, 1923 issue of AVIATION, and its soundness is borne out by the more recent F. A. I. ruling which prohibits contest officials from modifying racing rules in the slightest degree. But that being so, it would seem as if the F. A. I. will have to withdraw its previous ruling given at the 1922 Rome conference, for the two rulings are absolutely contradictory and would doubtless lead to lengthy controversies which can only hurt the sport of flying and be harmful to the authority of the F. A. I.

Detroit Plans Aero Show

Plans are now being perfected for holding at Detroit, Mich., from Dec. 5 to 9, 1923, the first local Airplane Exposition ever staged. The exposition is to be held in the Detroit Coliseum which has just been opened. The exposition will be for the entire state industry, and will have the attention of all branches of the trade throughout the state. Invitations are being sent to Ohio and Indiana organizations to join in the movement and very favorable responses have been had to date from several of the big bodies.

The Coliseum is the finest exposition in America and next to the Olympia, the largest in the world for affairs of this kind. It lends itself easily to decorations and by a series of terraces can hold an exposition of 300 exhibits on one floor where every exhibitor's sign is visible to the entire gathering at the same time. There are numerous convention halls, complete banquet halls and committee rooms to accommodate any kind of emergency.

British Air Chief on Flying Trip

Sir Samuel Hoare, British Secretary of State for Air and Chief of the Air Council, left London May 17 on a ten days' flying tour on the continent.

Sir Samuel, who was largely responsible for the Government's recent decision greatly to increase the strength of the British air forces, will spend the Whitsuntide recess in familiarizing himself with the problem of a civil aviation. To this end he will inspect different air routes and discuss air questions with foreign Air Ministers.

Sir Samuel and his party left England as ordinary passengers in an airplane of the Croydon to Rotterdam service. The next part of the trip will be by the Dutch air line to Brussels and thence the party will proceed to Cologne and from Cologne to Paris.

During the trip Sir Samuel will gain practical experience in traveling in a half dozen different types of machines used on the various air lines.

New Goodrich Airplane Tire

An interesting streamlined airplane tire has just been developed by the B. F. Goodrich Rubber Co., of Akron, Ohio. The Goodrich company has assiduously followed a program of aircraft accessory development in its department of aeronautics and it considers its new "skirted" airplane tire with streamline disk attachment a signal advancement in airplane tire designing.

The skirt of this new tire is a loose rubber-covered fabric flap vulcanized to the side-walls of the tire. The edge of the skirt is grommeted to receive the lacings which hold the windshield disk in position. This disk is so designed as to compensate automatically for uneven lacings or localized stretching and keep it smoothly taut at all times.

Streamline airplane tire manufactured by the B. F. Goodrich Co. of Akron, Ohio

The reduction of air resistance on landing gears equipped with these new tires is noticeable, Goodrich engineers assert. Streamlined airplane tires have long been considered essential to the most efficient performance of airplanes. By bringing the disk out to the side wall of the tire and making it even with the tire at its widest part, the Goodrich airplane tire overcomes the "pocketing" tendency of other styles where the disk is hooked over the rim.

The Plane and the Bulls

Another good story has been added to the comic history of aviation. After the eagle which attacked the aviator in mid air—which story was first told by Jules Vedrines in 1912, after his flight from Paris to Madrid—and the playful sea lion which climbed into a naval flying boat at San Diego, we now learn of a plane which was rushed by more or less wild bulls.

Capt. Georges Madon, one of the pilots of the Bapt (French) Flying Circus which is touring the world recently was missing for five days between Rome and Pisa, Italy. On landing at Rome, the French flier said that he was driven inland by high winds and that engine trouble compelled him to land in a field. When his machine came down it was charged by bulls which kept him sitting in the machine for many hours. Finally he succeeded in making good his escape and reached a flying field where he obtained assistance.

Essington School of Aviation

At a meeting held May 13 at the Essington Aviation School at Essington, Penna., there was formed the Flying Squadron of the Lu Lu Yacht Club of Atlantic City. The Essington Aviation School will be the Delaware River Base of the Squadron.

The following officers were elected for the ensuing year: Chas. Walber, Captain; J. H. Jolley, Commander; R. M. Hollingshead, Jr., 1st Lieutenant; Geo. E. Davis, 2nd Lieutenant; Frank Mills, Chief Pilot; Geo. F. Shaw, Senior Pilot; Wm. E. Hargraves, Junior Pilot; Wm. Wagner and R. O. Gilkes, Engineering Officers; Walter C. Wright, Secretary and John A. Larsen, Treasurer.

Immediately after the formation of the club plans were made for a flying handicap race to be staged in connection with the annual Yacht Race of the Yachtsmen's Club of Philadelphia and the Lu Lu Yacht Club of Atlantic City from Essington to Atlantic City June 22 and 23, 1923.

All officers are owners and pilots of their own planes and have entered them in this race. It is the first of its kind in the country. This being an invitation race, all owners of Hydroplanes are invited to participate in this event.

Send all entries to Walter C. Wright, Secretary, Essington, Delaware Co., Penna.

Glenn Martin Plant Busy

Steel and metal alloys are being used to a large degree by the Glenn L. Martin Co. in the new type airplanes being built at their factory in Cleveland. At the present time, forty-four airplanes, representing four different types, are in various stages of construction. In the majority of these, steel and duralumin are being used almost entirely.

Production has been started on thirty MO1 Observation planes for the Navy. A number of all metal naval scouts are nearly completed and assembly will soon begin on two "super bombers" for the Army Air Service. The factory is in full production with over a million and a half dollars worth of contracts on hand.

Wright-Dornier Plane at Washington

The Wright-Dornier all-metal pursuit plane which was described some time ago in AVIATION was flown on May 12 by Frederick Becker, test pilot of the Wright Aeronautical Corp. from Hazelhurst Field, N. Y. to Washington, D. C. The trip was made in about two hours and was for the purpose of enabling Army and Navy officials to familiarize themselves with this interesting ship.

The Wright-Dornier is fitted with 300 hp. Wright engine, and carried fuel for 3 hr. In a recent test at Hazelhurst Field the ship climbed 10,000 ft. in 6 min. The military equipment consists of two synchronized machine guns.

5th Anniversary of Air Mail

The Air Mail Service of the Post Office Department on May 15 celebrated the fifth anniversary of its inauguration by recording nearly 6,000,000 miles flown.

The Air Mail Service was started May 15, 1918, when the first plane, a Curtiss JNH, brought a consignment of mail from New York to Washington. Two years ago the New York to Washington route was abandoned for the trans-continental route between New York and San Francisco. It is expected that through mail service between these two cities will be established before the sixth birthday of the Air Mail Service.

St. Louis Air Races

Benjamin F. Bush, Chairman of the Board of Directors of the Missouri Pacific Railroad, has been appointed director-general of the St. Louis Air Races, to be held in October. Mr. Bush was present at a meeting of the finance committee of the Air Board when the announcement of his appointment was made, and immediately accepted.

"I regard the appointment not as an honorary one, but as an opportunity to do something worth while for St. Louis," he said. Other cities are making extensive preparations for the development of commercial air traffic, which many believe is just ahead. The international races should give St. Louis an adequate air terminal and place this city on the line of future transcontinental traffic. "The advertising value of the air races to St. Louis will be tremendous. All newspapers and other periodicals in every known language will print columns of news and photographs concerning these races, and St. Louis will be the center of it all. The international character of the races, and the fact that records for speed will undoubtedly be broken here, insure this."

Mr. Bush said he was not in position to go into details concerning the work he had undertaken, but that he expected to give personal attention to all important details. He conferred with B. Russell Shaw, Executive Vice Chairman of the Contest Committee of the National Aeronautic Association with regard to the program.

Since relinquishing the duties of president of the Missouri Pacific to become chairman of the Board, Mr. Bush said he had more time to devote to civic duties. He told a committee from the Air Board, consisting of George S. Johns, Louis P. Aloe and Col. A. T. Perkins, which waited upon him on his return from New York, that he had been working for years to make St. Louis an important point in transcontinental railroad traffic, and would do his best to give the city a ground floor position in transcontinental air traffic.

Mr. Bush was chosen a member of the Board of Directors of the St. Louis Aeronautic Corp., which is raising the money with which to finance the international races and buy and improve the field at Bridgeton.

J. M. Kurn, President of the St. Louis & San Francisco Railroad, has been made a member of the Executive Committee of the Air Board, of which M. Frank Carter is general chairman.

England Wants Larger Air Force

The British Cabinet has declared that a considerable increase in British air forces is necessary, the Duke of Devonshire, secretary for the colonies, informed the House of Lords on May 9.

The Duke, who heads the Government Committee, inquiring into the country's air strength, was taking part in a debate initiated by Lord Birkenhead, who based a demand for a one-power standard in the air on the enormous superiority of the French air force and declared Britain could not be content with such superiority in any country, however friendly.

In the R. Air Force estimates for 1923-24 an increase of eighteen airplane squadrons was provided for.

Kansas Girl Aviator Licensed

Miss Amelia M. Earhart, a native of Atchison, Kans., was granted an airplane pilot certificate by the National Aeronautic Association on May 16. Miss Earhart, who resides in Los Angeles, is the first woman licensed by the N. A. A., although several American women hold F. A. I. pilot certificates issued by the former Aero Club of America. The first American woman to obtain a pilot certificate was Miss Harriet Quimby, a Californian, who was breveted in 1911.

Miss Earhart used on her qualifying flights a Kinner airplane with 60 h. p. motor.

Re N.A.C.A. Nomenclature

Editor, AVIATION:—

While not wishing to take sides in the matter, I can't help adding a few words to the discussion on the N.A.C.A. Nomenclature which has been appearing in your columns. It is so easy to argue on a question of definition, that it must be accepted as a usual procedure. The surprising thing in this case is not the nature of the criticisms themselves but the apparent fact that no serious attempt had been made to get them *before* publication of the report in question.

As one of the announced purposes of the report was to standardize aeronautical nomenclature throughout the country, it would seem that the aeronautical publishers would be among the very first groups to be consulted. But so far from being consulted or represented, one would gather from the tone of your editorial remarks that they were not even permitted to see an advance copy. The same apparently applies to the industry and engineering profession generally speaking. There is no use trying to blame anyone, in fact I think the whole committee, individually should be commended for the efforts they have put forth in the common cause. But to make such efforts more worthwhile in the future it would be wise to take into account certain fundamental principles:—

1. A work of this kind, depending as it does on matters of usage and convenience, is in quite a different class from scientific reports and cannot be "handed down" in the same manner.

2. If it is to be a compendium of common usage in such a new subject it is of great importance to get evidence from all available sources as to what is "common usage".

3. If the report is to contain "invented" terms it is still more important to get a broad consensus of opinion as to whether such "improvements" are desirable.

4. Representation on the Committee should certainly include proportionately more from private life than one in eight, and a liberal use of preliminary drafts should be made in similar fashion to the Safety Code now being drawn up at the Bureau of Standards.

RALPH H. UPSON.
Detroit, Mich. May 16, 1923.

Air Line at Capri

A speedy daily air service is about to be inaugurated between Naples and the Island of Capri, twenty miles out in the bay of Naples, Italy, by the management of a large hotel, U. S. Consul General Byington reports. A seven passenger seaplane had been obtained and a license applied for in April.

Leaving the Naples hotel, the plane will circle over the beautiful bay in the direction of Amalfi and return to Naples. The arrangement will be an enormous improvement over the long and tedious boat trip which is sometimes very rough. The fare will probably be about 50 lire, or approximately $2.50. As there is little profit at such a rate, the hotel is expected to gain a return through the advertising value of the air service.

Aeronautical Patents

Granted May 1, 1923

1,453,307 Airplane Suspension. Henry A. Crawford, Tulsa, Okla.

1,453,426 Fairlead or Guide for the Control Cables of Aircraft. Seldon T. Williams, Philadelphia, Pa., assignor to Westinghouse Electric & Mfg. Co., a Corporation of Pennsylvania.

1,453,496 Hydroairplane. Claudius Dornier, Friedrichshafen, Germany, assignor to the Firm Luftschiffbau Zeppelin Oeselischaft mit beschrankter Haftung, Friedrichshafen, Germany.

1,453,830 Airplane. Henry Coakley, New York, N. Y.

1,453,951 Flying Machine Propeller. John Mortimer Raymond, New Orleans, La.

ARMY AND NAVY AIR NEWS

U. S. Army Air Service

Activities at Fairfield Air Intermediate Depot—The Repair Branch of the Fairfield Air Intermediate Depot, Ohio, is extremely active. During the month of March there were turned out complete with engines and flight tested: 20 DH4B's, 1 DH4B1, 4 JN4HGA2, 8 JN6H1, 1 Spsd 13E, total 35; engines completed: 21 Laherty 12A's, 10 Wright I's, 12 Wright A's, 2 Wright E's and 1 Wright H, total 46.

In addition to the above, work is progressing on ten DH4B3 planes designated for a proposed Panama Flight, and which is scheduled to begin during the month of September. The planes are of similar design in detail as those that have successfully completed the Porto Rican Flight.

The Repair Branch has also been called on to transfer eight JN4H planes with engines to Chanute Field, Rantoul, Ill., and six JN4H planes with engines to Maxwell Field, Ala.

Another GA1 plane has been completed, flight tested and transferred to the Attack Group at Kelly Field, Tex. This makes four of the "Flying boiler factories" for the Attack Group. Work on the setting up of a fifth machine of this type has commenced. Work is progressing satisfactorily on the Martin Bomber which was wrecked while being ferried to Kelly Field, and marks the first ship of this type to be reconditioned at this Depot.

A surplus property sale was held at the Depot on May 2. The Supply Branch was engaged during the past month getting things in shape for this sale. The property to be disposed of amounts to approximately $400,000. Bill Thorpe of M. Fox & Sons, Baltimore, Md., superintended the details of the preparation of this sale and had charge of the auction.

During the month of March the Depot loaded and shipped 130 DH4 front and 130 DH4 rear fuselages to various manufacturing plants in the East. These ships of the DH4A type are to be converted into DH4B types, Roger Q. Williams, joint representative of all the manufacturers interested in the conversion of these ships, supervised the shipments at the Depot.

* * *

Middletown Depot Adopts Aerial Freight System—The Middletown Air Intermediate Depot, Pa., is daily proving the practicability of air transport. So large an amount of material is being moved through so great a distance in so small a time and with so few rehandlings as to make the service of the railroad seem puny by comparison. That the airplanes used are of military type, in the design of which stowage space is given little or no consideration, makes the feat more worthy of note.

The Martins and Handley from Aberdeen Proving Grounds do the bulk of the heavy hauling, but an occasional ship from Mitchel Field lands light and departs loaded to the scuppers with various parts and gadgets, while T. P. Smith from Bolling Field frequently visits the Depot.

* * *

Kelly Field Band Bids Fair to Become Famous—The Kelly Field Band, which was organized in February, 1921, has reached such a point of proficiency that letters of praise have been received from 29 States of the Union and two provinces of Canada, as well as Havana, Cuba. The fame of this band has been spread by radio, a concert having been recently given under the direction of Louis Witt, at the Elks' Club, which was broadcasted by the Radio Phone Station of the Southern Equipment-Evening News-Express, of San Antonio, Texas.

Army Orders—The following Air Service officers have been relieved as students at the A. S. Tactical School, Langley Field, Va., and have been assigned to the stations following their name:

Capt. Christopher W. Ford, Langley Field, Obs. Sqd.; Capt. Howard J. Houghland, Kelly Field, Tex., with the Attack Group; Capt. Lynwood B. Jacobs, Langley Field; Capt. Albert M. Ouidera, Kelly Field with 10th Group; Capt. Edmund W. Hill, Scott Field, airship training; Capt. Francis M. Brady, Mitchel Field; Capt. Warner B. Gates, Scott Field, airship training; Capt. George S. Warren, Fairfield, Ohio, with 88th Obs. Sqd.; First Lieut. George P. Johnson, Chanute Field; First Lieut. Frank O. Hunter, Selfridge Field.

First Lieut. Charles H. Dowman and Sec. Lieut. Charles S. Howard, A.S., relieved as students at Signal Corps Radio School, Camp Vail, N. J., to Technical School, Chanute Field, as instructors in communications.

First Lieut. Donald D. Fitzgerald, A.S., relieved as student at Signal Corps Radio School, to Kelly Field.

The following A. S. officers, relieved as students at Engineering School, McCook Field, to McCook Field for duty: Capt. Gerald E. Bower, First Lieuts. Clarence S. Loher, Harry A. Sutton, John A. Macready, Bayard Johnson and Donald L. Bruner.

First Lieut. Wallace G. Smith, A.S., relieved as a student at Sheffield Scientific School, New Haven, Conn., and duty at Langley Field, to Technical School, Chanute Field, as instructor in communications.

Leave of absence of two months granted to First Lieut. William H. Carthy, A.S., with permission to extend it one month.

First Lieut. Lawrence L. Peak, A.S., relieved from training at Primary Flying School, Brooks Field, to Brooks Field for duty.

Capt. John W. Kelley, A.S., retired from active service on incapacitated.

Leave of absence one month to First Lieut. Milo McCune, A.S.; two months to Capt. Truman E. Boudinot, A.S.; two months (sickness) to First Lieut. John H. Gardner, A.S.

First Lieut. George C. Kenney, A.S., from Curtiss Aeroplane & Motor Corp., Garden City, L. I., to McCook Field.

Maj. William N. Hensley, jr., A.S., relieved as student at General Service Schools, Fort Leavenworth, Kan., to Mitchel Field.

Maj. William H. Garrison, jr., A.S., relieved as student at General Service Schools, to Bolling Field, D. C., to assume command.

Capt. Truman E. Boudinot, A.S., relieved from Air Service, assigned to 9th Cavalry.

Maj. Frank M. Andrews, A.S., from Office, C.A.S., to Kelly Field.

Relieved from Middletown A.I.D., Penna., and assigned to duty as indicated, First Lieuts. Arthur J. Melanson, Chicago; Bernard J. Tooher, Buffalo, N. Y.; Sigmund F. Lauders, San Francisco; Hugh C. Downey, Dayton, Ohio.

Maj. Millard F. Harmon, A.S., relieved as student at General Service Schools, to Seattle, Wash., as asst. professor in military science and tactics, University of Washington.

* * *

All Metal Commercial Plane at Selfridge Field—The "Air Sedan", a Stout all-metal monoplane built for commercial purposes, is being tested out at Selfridge Field, Mt. Clemens, Mich., and is attracting considerable attention. It is a three-passenger craft equipped with a Curtiss OX5 motor, and is showing up very satisfactorily.

Orders to Officers—Sec. Lieut. Michael V. Healy, A. S, relieved from training at A.S. Primary Flying School, Brooks Field; to duty at Brooks Field.

First Lieut. Hjalmar F. Carlson, A.S., relieved from temp duty at Carlstrom Field, Fla., and from duty at Maxwell Field, Ala., to sail from New Orleans June 15, 1923, for Panama Canal Zone, to duty with A.S.

Capt. Charles E. Rust, Brooks Field, First Lieut. Robin A. Day, Kelly Field; First Lieut. Morris L. Tucker, Fairfield A.I.D.; First Lieut. William W. Welsh, Brooks Field; First Lieut. Walter H. Reid, Selfridge Field; First Lieut. Earle J. Carpenter, Bolling Field; First Lieut. Oliver K. Robbins, and Sec. Lieut. Edgar T. Selzer, Kelly Field, to sail from New Orleans for Panama Canal Zone.

Capt. Clinton E. Fenters, A.S. (Inf.) relieved from further detail in A.S. and duty at Brooks Field, to Second Division, Fort Sam Houston, Tex.

Leave of absence for three months granted to First Lieut. Raphael Baez, jr., A.S., with permission to return via Suez Canal.

First Lieut. Lewis R. P. Reese, A.S., now on leave of absence in Baltimore, Md., to report to Walter Reed Hospital for treatment.

Maj. Rush B. Lincoln, A.S., relieved as student at General Service Schools, Ft. Leavenworth, Kan., to duty at Scott Field, Ill.

Capt. Earl L. Naiden, A.S., relieved as student at General Service Schools, Ft. Leavenworth, Kan.; to duty at Langley Field.

Maj. John D. Reardan, A.S., relieved as student at General Service Schools, Ft. Leavenworth, Kan.; to report to C.A.S.

Glen Tree Lampton appointed as Second Lieutenant, A.S., Regular Army from civil life; to duty at Kelly Field.

First Lieut. Devereux M. Myers, A.S., relieved from duty at Langley Field, to duty at Aberdeen Proving Ground, Md., with A.S. troops.

Staff Sergt. Samuel C. Lewis, 12th Airship Co., placed upon retired list at Scott Field.

First Lieut. Douglas Johnston, A.S., relieved from duty at Kelly Field; to duty as student in Balloon and Airship School at Scott Field.

Maj. Henry Abbey, jr., A.S., relieved from duty with Org. Res. New York City and Second Corps Area; to sail from New York about Sept. 6, 1923, for Panama Canal Zone for duty with A.S. troops.

First Lieut. John W. Benton, A.S., relieved from duty at Crissy Field; to sail from San Francisco about June 23, 1923, for Panama Canal Zone for duty with A.S. troops.

First Lieuts. A.S. Ulysses G. Jones, Langley Field, John H. Gardner, Chanute Field, Silas C. Hyndshaw, Mitchel Field, Edgar E. Glenn, Chanute Field, Charles T. Skow, Maxwell Field and Evers Abbey, Mitchel Field, to sail from New York about Sept. 6, 1923, for Panama Canal Zone for duty with A.S. troops.

First Lieut. Edward M. Haight, A.S., relieved from duty at Kelly Field; to duty at Selfridge Field.

Capt. Thomas S. Voss, Kelly Field, First Lieut. James T. Curry, jr., Mitchel Field, First Lieut. Clarence E. Shankle, Aberdeen Proving Ground, First Lieut. William L. Boyd, McCook Field; First Lieut. Francis P. Booker and Sec. Lieut. Edward A. Hillery, Langley Field, to sail from New York about Oct. 4, 1923, for Panama Canal Zone to duty with A.S. troops.

* * *

Changes in Designation of Air Units—The Adjutant General's Office announces the following changes in the designation of Air Service Units:

7th Observation Group Hq. is redesignated 7th Bombardment Group Hq.

9th Observation Squadron is redesignated 9th Bombardment Squadron.

1st Balloon Company is redesignated 1st Airship Company.

13th Balloon Company is redesignated 13th Airship Company.

Lieutenant Harris' Speed Records—At 6.28 a. m., April 17, after the T2 had been in the air almost 24 hr. Lieut. Harold R. Harris, Chief of the Flying Section, McCook Field, took off in a DH4L, the same airplane he used to capture the 1000 kilometer speed record, and long before the T2 was ready to come to earth, he descended with the 1500 and 2000 records snugly secured. The rear cockpit of the DH4L was torn out for this flight to accommodate fuel tanks sufficiently large to carry 301 gal. of gasoline and 18 gal. of oil. The front cockpit was closed over with Balsa wood, with two small holes left on each side through which Lieutenant Harris could look out. The fuel supply was slightly larger than that carried by Lieutenant Doolittle on his transcontinental flight.

The same timers and observers who were officiating for the flight of the T2 served for Lieutenant Harris' flight and they had a busy day of it. Several times the speedier DH almost doubled laps on the T2 and the two planes passed over the timers' stand almost at the same instant. The flight was without special incident, the airplane and engine remaining in excellent shape throughout, and the staunch little DH holding a remarkable steadiness of speed. The average speed for the total distance, which is equal to 1,242 miles, was 114.22 m.p.h., exceeding the French record 49 m.p.h. Lieutenant Harris landed at 5.21 p. m., having been in the air 10 hr. 53 min.

His appearance as he climbed from the cockpit was quite a contrast to the two pilots who came down later and who were bespattered with oil and grease. Owing to the protection of the closed-in cockpit, Lieutenant Harris emerged clean and smiling, the vigorous stamping of his feet, as he talked to the group assembled to congratulate him, being the only indication of his long cramped position.

* * *

Airship Transports Air Service Recruits—On April 18 the airship D2 took off from Scott Field, Ill., for the purpose of picking up three recruits for the Air Service who enlisted at Mt. Carmel, Ill. The journey of 116 miles was covered in 2½ hr. When Mt. Carmel was reached a landing was made with the assistance of the citizens of that place, and while the three recruits were undergoing the medical examination by the medical officer who was a passenger aboard the airship, the Mayor of the city and several aldermen were taken up for a short flight.

At noon the ship took off with the three recruits on board. Several storm areas were encountered, forcing the ship to leave its course and delaying its return until 4.30 p. m. The crew was composed of Lieuts. Arthur Thomas and Ira Koenig, pilots, Lieut. J. A. Physioc, recruiting officer, Capt. R. K. Simpson, Surgeon, and Sergeant Greenfield, Engineer.

* * *

Machine Guns Tested at Selfridge Field—Captain Jervis, Captain Skinner and Lieutenant Hughes, of the Ordnance Department, Lieutenant Fletcher, A. S., of McCook Field, and a representative from the Browning Machine Gun Co., were with the First Pursuit Group a few days recently for the purpose of making tests of the new Browning .50 calibre machine guns. Ground tests were made under very adverse conditions with the temperature a few degrees above zero. Air tests were made with the gun mounted on the MB3A during a blinding snow storm. The performance of the gun was very satisfactory. All of the MB3A's of the Group in service will be equipped with these guns, and a regular training schedule in ground target and towed target work will be shortly started.

* * *

New Commandant at Bolling Field—Maj. Wm. H. Garrison, jr., A.S., has been designated as the new commandant of Bolling Field, D. C., to relieve Maj. Geo. E. Lovell, A.S.A., acting Commandant. Major Lovell relieved Major Reinburg, who was recently detailed to the Philippines. Major Garrison is a graduate of West Point, and has just finished a course at the General Service School of the Army at Fort Leavenworth, Kan.

U. S. Naval Aviation

Naval Aircraft During Shrine Convention—A demonstration of naval aerial activities in the Potomac River and an exhibition of naval planes around the base of the Washington Monument will be given during the Shrine conclave which will be held in Washington June 5, 6 and 7. Squadrons of planes from the Atlantic Fleet Air Force are being ordered to the capital to participate in the demonstration, and many interesting developments of naval aviation will be shown for the benefit of the several hundred thousand visitors who are expected in the city.

The exhibition of naval planes, which will remain in the Monument grounds throughout the Shrine activities will include practically all types of planes in service use in the Navy from the smallest seaplane in the world, developed for submarines, to the largest types of scouting planes. The historic NC4 which made the first trans-Atlantic voyage has been shipped from Philadelphia and will be erected for exhibition. The NC4 will ultimately be placed in the Smithsonian Institution.

The demonstration over the Potomac River will consist of formation flying, aerial combat, bomb dropping, and torpedo plane work.

An F5L scouting plane has been fitted with the smoke screen device which has recently been developed by the Navy. During the exercises this plane will lay a smoke screen over Potomac Park illustrating the use of the screen for tactical purposes in connection with aerial operation of naval planes.

The marine aviation section from Quantico will give an exhibition of squadron combat work. Marine Corps bombing and observation planes will be included in the exhibition at the Monument grounds. An unusual feature will be an address of welcome by radio phone from a Marine Corps plane. It will be broadcasted to the audience on the ground by means of a loud speaker.

* * *

Naval Air Station, Lakehurst, N. J.—This station continues to be flooded with visitors to the score of about 700 a week, and only a few days ago a party of eighteen state officials dropped in for a glimpse of the ZR1 before her outer skin was in place. They marvelled, of course, at her magnitude and the intricacies of her construction, but had they only known that they were in the presence of a far greater miracle, one that could be likened to Moses famous exploit of drawing water from a stone, how enormous their astonishment would have been. Two years ago the Navy, in its site at Lakehurst could boast of the finest crop of sand East of the Mississippi and North of Pensacola, today the barren waste is no more, and from morning until night the cheerful choking of the mowing machine can be heard as the first harvest of rye is being reaped from off the landing field. Next year a crop of genuine hay is hoped for, but the personnel at Lakehurst are advised to proceed cautiously in their optimism for quick is the Department of Agriculture to brand to justice offending nature fakers.

* * *

U. S. Naval Air Station, Pensacola—On May 1, the members of class 18 for aviation training were officially launched on their career of chasing each other around and around Pensacola Bay in their quest for a pair of little gold wings. The class numbers 59 student Naval Aviation Pilots who will follow the entire course as outlined in the standard training syllabus.

* * *

Aircraft Squadrons, Scouting Fleet—On Thursday, May 3, while conducting a flight for altitude, Aviation Chief Machinist's Mate H. E. Tatman and Aviation Chief Machinist J. J. Erdkamp, both attached to Observation Squadron One, were instantly killed when Vought airplane No. A 5924 crashed to a complete wreck near Sweet Water Dam, Calif.

Orders to Officers May 8 to May 15, 1923—Lieut. John D. Price, U.S.N.—Detached Naval Aircraft Factory, Philadelphia, Pa.; to U.S.S. Maryland.

Ens. Lawrence W. Brown, U.S.N.—Detached Naval Air Station, Pensacola, Fla.; to U.S.S. Idaho.

Lieut. R. P. Henderson (MC) U.S.N.—Detached U.S.S. Aroostook; to Flight Surgeon Aircraft Squadrons Battle Fleet.

Lieut. Jacob H. Kyger (SC) U.S.N.—Detached Naval Aircraft Factory, Philadelphia, to U.S.S. Maryland assistant for disbursing and to supply officer.

Lieut. Martin Griffin, U.S.N.—Detached Torpedo and Bombing Plane Squadron One, Aircraft Squadrons Scouting Fleet; to Naval Air Station, San Diego, Calif.

Pay Clk. James L. Creekman, U.S.N.—Detached Naval Air Station Hampton Roads, Va.; to U.S.S. Wright.

Lieut. Benjamin R. Holcombe, U.S.N.—Detached Aircraft Squadrons Scouting Fleet; to Bureau of Aeronautics, Washington, D. C.

Lieut. Andrew C. McFall, U.S.N.—Detached U.S.S. Maryland; to Naval Aircraft Factory, Navy Yard, Philadelphia, Pa.

Bosn. Walter C. Fitzpatrick, U.S.N.,—Detached Naval Air Station, Anacostia, D. C., to Aircraft Squadrons Scouting Fleet.

Bosn. Herman C. Fredericks, U.S.N.—Detached U.S.S. Aroostook; to U.S.S. Ortolan.

* * *

Naval Pilots for National Balloon Race Chosen—Announcement was made last week of the pilots who will command the four naval balloon entries in the National Elimination Free Balloon Race to be held at Indianapolis on July 4. They are: Lieut. Comdr. J. P. Norfleet, U.S.N., Lieut. F. P. Culbert, U.S.N., Lieut. L. J. Roth, U.S.N. and Lieut. T. B. Null, U.S.N.

The four balloons which will be entered in the contest by the Navy will be assembled at the Naval Air Station, Lakehurst, N. J., by June 15 and will then be shipped to Indianapolis. Practice flights in preparation for the contests have been authorized, and will be held from now until the time the crew of the racing balloons is assembled at Indianapolis. These flights will take place from Lakehurst and from Hampton Roads. A ground crew under the command of Lieut. W. J. Medusky will be sent to Indianapolis. It will consist of twelve men from the Naval Air Station, Hampton Roads. They will be ordered to arrive in Indianapolis not later than July 1. J. J. Coughlin of the Naval Aircraft Factory will assist Lieutenant Medusky with the ground work in connection with the race.

Coming Aeronautical Events

AMERICAN

July 4 — National Balloon Race, Indianapolis, Ind.
Oct. 1-3 — National Airplane Races, St. Louis, Mo.
Late Fall — Curtiss Marine Flying Trophy Race.

FOREIGN

June 25-30 — International Aero Congress, London.
July 20- — International Aero Exhibition, Gothenburg, Sweden.
Aug. 3-31 — Seaplane Meet, Rhoen, Germany.
Aug. 5-26 — Seaplane Meet, Vauville, near Cherbourg, France.
Sept. 23 — Gordon Bennett Balloon Race, Brussels, Belgium.
Sept. 28 — Schneider Maritime Aviation Trophy Race, Cowes, Isle of Wight, England.
Dec. 1 — Entries close for French Engine competition.

Officers Selected for Aviation Training—The following officers have been selected for Aviation Training at the Naval Air Station, Pensacola, Fla., in the Class commencing July 1, 1923:

LIEUTENANTS

Palmer, C. J.	Paddock, H. E.
Garrett, W. S.	Davis, A. C.
Warlick, W. W.	Small, J. D.
Mullinix, H. M.	Sayre, F. N.

LIEUTENANTS (J.G.)

McKay, J. H.	Shoemaker, J. E.
Tague, J. R.	Hansen, I. M.
Haeberle, G. C.	Buehler, A. R.
Wilkes, C.	Lamore, R. T.
Sinton, W.	Veeder, T. D. W.
MacGregor, M. D.	Rust, H. C.
Allison, W. C.	Updegraff, W. N.
Miner, O. R.	Gregory, G. H.
Hepburn, W. P.	Morrison G. D.
Hawkins, K. C.	

ENSIGNS

Switzer, W. C.	Kirkpatrick, J.
DeBaun, P. H.	Head, C. M.
Killian, R. R.	Hamilton, J. E.
Selby, M. E.	DeLong, Mills
Isbell, A. J.	Womble, J. P.
Stogsdall, R. R.	Hill, R. D.
Moebus, L. A.	Kahn, G. G.
Graham, A. M.	Foster, R. R.
Van Deurs, G.	VanCleave, M.
Wilson, D. H.	Farhney, D. S.
Bowman, R. L.	Conlan, C. V.

Maj. Ross E. Rowell, Marine Corps, has been detached from the Naval Air Station at Pensacola, and assigned to the Army Air Service Flying School, at Kelly Field, San Antonio, Tex.

• • •

Aerial Cowboy Tactics for Landing Plane in Pasture—Clearing a landing field of cows preliminary to landing a DH which was overtaken by a storm called for tactical skill in the handling of a Navy plane last week by Ens. A. L. Williams and Lieut. F. W. Neilson of the Bureau of Aeronautics. Before the plane could be brought to a landing it was necessary to make several passes over the field and drive the herd of bovines into a corner in order to gain a clearing large enough to bring the plane to earth.

Ensign Williams and Lieutenant Neilson were returning from a flight to the Naval Air Station in Lakehurst, and were passing over Upper Marlboro, near Washington, when overtaken by a violent thunderstorm. A forced landing was necessary and the pilot began to cast around for an emergency landing field. The most suitable spot that could be located was a green pasture, smooth and level in which a herd of cows was grazing. The plane nosed over for a landing while the pilot hoped the animals would ease over hospitably and afford him enough room to land. Unacquainted with the courtesy of landing fields, the cows showed no disposition to discontinue browsing until Williams had made several skillful passes over them driving them into a corner. With a clear field and under the eyes of an astonished and outraged audience, the pilot brought his plane down just in time to avoid the storm.

• • •

N.A.A. Gives Camp Site and Landing Field Guide to Naval Pilots—A booklet of convenient size and great value to all who travel by earth or air has recently been published by the National Aeronautic Association, and copies have been sent out to all pilots in Naval Aviation with the compliments of the N.A.A. The book is a compilation of data on all landing fields and camp sites in the United States, giving their location and a tabulation of the facilities for each field and site. A supplement accompanies the book in the form of a map on which is indicated the location of landing fields with a designation for each, indicating whether it is improved or unimproved. Another map on the reverse side indicates the camp sites available for auto tourists.

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SOARING MACHINES—Prof. Miller's design. High grade sailing planes ready built $250 00. Or build your own. Drawings $2 50. J. W. Miller Aircraft Corp., Seattle, Wash.

FOR SALE—Curtiss M-F Flying boat with K-6 Motor. Practically new. Equipped with Self Starter. Carries two passengers and pilot. Great bargain. Margo Engineering Corp., 167 W. 64th St., New York City.

FOR SALE—Laird Swallow Special 150 Hisso. Flown less than 25 Hours. Cost Fifty Two Hundred. Will sell for Thirty Five Hundred. William A. Burke, Okmulgee, Okla.

New Hispano Standards $1200. Also one or two used Canucks at $500 in flying condition. Write or wire Wilbur Larrabee, Groveland Avenue, Minneapolis, Minn.

Make me an offer for one Standard J1 Fuselage, in good condition, and one 200 H.P. new Curtiss V 2 Motor. Box 248.

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The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

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